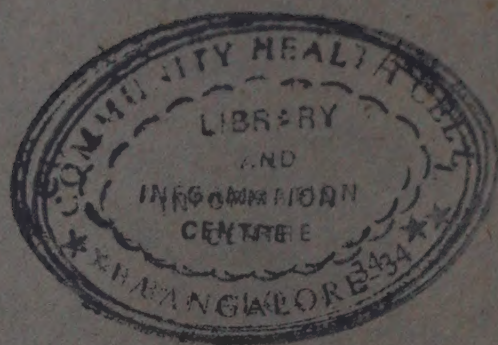




198 GOLF LINKS NEW DELHI-110 003





***Community Health Cell***  
**Library and Information Centre**

# 359, "Srinivasa Nilaya"  
Jakkasandra 1st Main,  
1st Block, Koramangala,  
BANGALORE - 560 034.  
Ph : 2553 15 18 / 2552 5372  
e-mail : chc@sochara.org



Radman

Report  
On  
Uttar Pradesh, Madhya Pradesh  
Orissa, Karnataka and Bombay

By  
  
B R PATIL

"I hold it for indisputable, that the first duty of  
a State is to see that every child born therein  
shall be well housed, clothed, fed and educated  
till it attains years of discretion."

- Ruskin

**COMMUNITY HEALTH CELL**

*Library and Information Centre*  
No. 367, Srinivasa Nilaya, Jakkasandra,  
I Main, I Block, Koramangala, Bangalore - 560 034.

THIS BOOK MUST BE RETURNED BY  
THE DATE LAST STAMPED

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|







# C O N T E N T S

Page nos.

|             |                                       |         |
|-------------|---------------------------------------|---------|
| Chapter I   | Introduction                          | 1 - 12  |
| 1.1         | Cause of Concern                      | 1 - 10  |
| 1.2         | Purpose of Project                    | 10 - 12 |
| Chapter II  | Methodology                           | 13 - 23 |
| 2.1         | Risk Approach                         | 13 - 14 |
| 2.2         | Population Groups                     | 14 - 15 |
| 2.3         | Sample Design                         | 15 - 16 |
| 2.4         | Schedules                             | 16 - 18 |
| 2.5         | Data Problems                         | 18 - 19 |
| 2.6         | Range of Variables                    | 19 - 22 |
| 2.7         | Analysis Plan                         | 22 - 23 |
| Chapter III | Analysis of Profiles                  | 24 - 29 |
| 3.1         | Profile of Communities                | 24 - 26 |
| 3.2         | Profile of Health Workers             | 26 - 29 |
| Chapter IV  | Analysis of Risk Factors              | 34 - 60 |
| 4.1         | Analysis Strategy                     | 34 - 41 |
| 4.2         | Analysis tables 4.1 - 4.23            | 42 - 60 |
| Chapter V   | Conclusions and Suggestions           | 61 - 74 |
| 5.1         | <del>Purpose</del> Cause and Concern  | 61 - 61 |
| 5.2         | Unique Features                       | 61 - 62 |
| 5.3         | Coverage & Sampling                   | 62 - 62 |
| 5.4         | Analysis of Profile                   | 63 - 64 |
| 5.5         | Analysis of Risk Factors              | 64 - 64 |
| 5.5.1       | Pre-conception and post-infancy stage | 64 - 65 |
| 5.5.2       | Pre-natal Stage                       | 65 - 66 |
| 5.5.3       | Post-natal Stage                      | 67 - 68 |
| 5.5.4       | Perinatal Stage                       | 68 - 70 |
| 5.5.5       | Risk-factors as Determinants          | 70 - 73 |
| 5.5.6       | Towards Interventions                 | 73 - 74 |
|             | Select Bibliography                   |         |







# LIST OF TABLES

|  | <u>Page nos.</u> |
|--|------------------|
| Table 1 Infant Mortality & Fertility in Asian Countries  | 3                |
| Table 2 Infant, neo-natal and post-natal mortality rate in rural and urban areas in India (1976 - 1984)  | 5                |
| Table 3 Infant Mortality Rates in Major States (1970-72 To 1985-86)  | 6                |
| Table 4 Infant Mortality Rates & Total Fertility Rates in Major States   | 8                |
| Table 5 Infant Mortality and Fertility Rates alongwith other Indicators of Development in Major States   | 11               |
| Table 3.1 Percentage Distribution of Localities with Access to Health Education & other infrastructural facilities   | 25               |
| Table 3.2 Profile of Health Workers in terms of age, marital status, education and job satisfaction  | 27               |
| Table 3.3 Percentage of dais, and ANMs with training received in essential tasks related to maternal and child health care   | 28               |
| Table 3.4 Percentage distribution of dais, & ANMs indicating Correct knowledge   | 30               |
| Table 4.1 Prevalence Rate (PR), Incidence Rate (IR), Relative Risk (RR) and Attributable Risk (AR) associated with Mother's age at child birth, parity, preceding birth interval and previous pregnancy losses | 42               |
| Table 4.2 PR, IR, RR & AR associated with mother's sickness, health, loss of weight and smoking during pregnancy   | 43               |
| Table 4.3 PR, IR, RR & AR associated with mother's dietary intake, work, sleep and rest during pregnancy   | 44               |
| Table 4.4 PR, IR, RR & AR associated with pre-natal check-up and care received by the mother   | 45               |
| Table 4.5 PR, IR, RR & AR associated with obstetrical factors  | 46               |
| Table 4.6 PR, IR, RR & AR associated with obstetrical factors  | 47               |
| Table 4.7 PR, IR, RR & AR associated with breast-feeding, supplementary feeding and immunization   | 48               |
| Table 4.8 PR, IR, RR & AR associated with Health & Growth Status   | 49               |
| Table 4.9 PR, IR, RR & AR associated with infection and malnutrition   | 50               |
| Table 4.10 PR, IR, RR & AR associated with Fertility behaviour and intentions  | 51               |







|            |   |    |
|------------|---|----|
| Table 4.11 | Preference for number of children and Family Planning Methods   | 52 |
| Table 4.12 | PR, IR, RR & AR associated with Drinking Water and environmental sanitation                                       | 53 |
| Table 4.13 | PR, IR, RR & AR associated with necessities of life and season of delivery  | 54 |
| Table 4.14 | PR, IR, RR & AR associated with Housing Conditions  | 55 |
| Table 4.15 | PR, IR, RR & AR associated with socio-economic background of child's parents                                      | 56 |
| Table 4.16 | Reasons for no proper medical attention or care received from the trained medical personnel at birth and sickness | 57 |
| Table 4.17 | Exposure to Personal and Mass Media Contacts for pre-natal and post-natal care and health information             | 58 |
| Table 4.18 | Significant correlates of monthly household income i.e. access to resources and health services                   | 59 |
| Table 4.19 | Determinants of infant mortality indicated by Beta coefficients significant at 2.0 T-Value                        | 60 |
| Table 4.20 | Percentage distribution of mothers having inadequate dietary intake of different food items                       |    |
| Table 4.21 | Percentage distribution of mothers affected by the symptoms of diseases and malnutrition                          |    |
| Table 4.22 | Percentage distribution of infants affected by the symptoms of diseases and malnutrition                          |    |
| Table 4.23 | Percentage distribution of infants by morbidity, malnutrition, poor health and delayed growth status              |    |







### Acknowledgement

The Family Planning Foundation is grateful to the International Development Research Centre for its financial support; the Government of India for its concurrence and the State Governments of Uttar Pradesh, Madhya Pradesh, Orissa, Karnataka and Maharashtra for their cooperation.

The Foundation is also grateful to all the members of the study team for implementation, to members of Advisory Group for useful suggestions, to investigators for data collection and people from study areas for providing data - without which this project would have not become relevant and useful to planners and policy makers who must respond to its results and recommendations.

"Utmost reverence is due to a child" - Juvenal







### 1.1 Members of the Study Team

- |  |                    |
|--|--------------------|
| 1. Dr B R Patil, Project Director<br>Family Planning Foundation<br>New Delhi.                    | For all States.    |
| 2. Dr T S Papola, Project Leader   | For Uttar Pradesh  |
| 3. Dr M S Ashraf, Co-Leader<br>Giri Institute of Development Studies<br>Lucknow.                 | For Uttar Pradesh  |
| 4. Dr Rita Sapru, Project Leader   | For Madhya Pradesh |
| 5. Dr Indira Murali, Co-Leader<br>National Institute of Health &<br>Family Welfare<br>New Delhi. | For Madhya Pradesh |
| 6. Dr Nityanand Patnaik, Project Leader  | For Orissa         |
| 7. Dr Almas Ali, Co-Leader<br>Institute of Tribal Health and<br>Social Sciences<br>Bhubaneswar.  | For Orissa         |
| 8. ✓ Dr P H Reddy, Project Leader  | For Karnataka      |
| 9. ✓ Dr P J Bhattacharjee, Co-Leader<br>Population Centre<br>Bangalore.                          | For Karnataka      |
| 10. Dr Victor S D'Souza, Project Leader  | For Bombay Slums   |
| 11. Mrs Rajani Paranjpe, Co-Leader   | For Bombay Slums   |







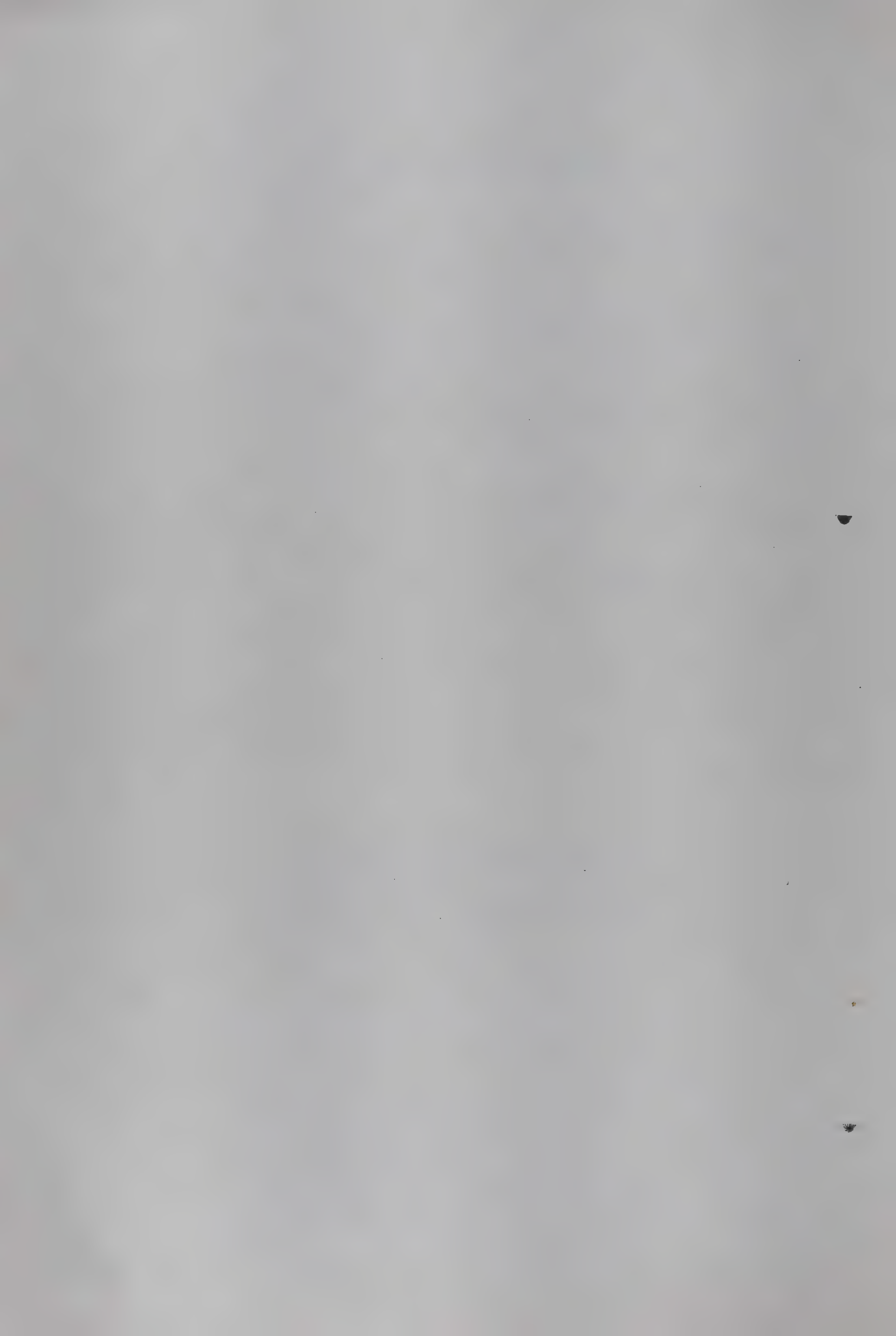
### 1.2 Members of Advisory Group

1. Dr T N Madan (Sociology)  
Institute of Economic Growth  
Delhi.
2. Dr P P Talwar (Demography)  
National Institute of Health & Family Welfare  
Delhi
3. Mr P N Kapoor (Statistics)  
Ministry of Health & Family Welfare  
Delhi
4. Prof O P Ghai (Paediatrics)  
All India Institute of Medical Sciences  
Delhi.
5. Dr P N Sehgal (Epidemiology)  
National Institute of Communicable Diseases  
Delhi.
6. Dr Vijay Kumar (Community Medicine)  
Postgraduate Institute of Medical Education & Research  
Chandigarh.

### 1.3 Consultants for Data Processing and Analysis

1. Mr Raj Bhatia, SDC Data Systems Private Limited, and
2. Mr M A Gandhi.







## CHAPTER - 1 : INTRODUCTION

### 1.1 Cause of Concern:

"The child was born and cried,  
fell sick and died, before the  
tears dried."

- Anon

"An infant crying in the night  
an infant crying for the light  
and with no language but a cry."

- Tennyson

This is a story of about 14 thousand children who were born in 1986-87 in a population of about 147 thousand spread in hilly, rural, tribal, slum and urban areas of five states. They all cried, 34 per cent fell sick and 12 per cent died before seeing the candles of their first birthday. This tells us what happened to them during their brief journey of life from womb to tomb, from cradle to grave. Their life began with a cry and ended with a groan. But they all must have cried for the light to be thrown on the risk factors reducing the chances of their survival and on the failures of their care-takers in their home and nation to control them, with no language but a cry. Before coming to the specifics of this story, the national scene is presented first which is extremely disturbing.

Next to China, India has the largest population in the world. Today it is around 800 million. World's 16 per cent, Asia's 28 per cent and South Asia's 71 per cent population lives in India. World's largest number of births over 26 million, deaths over 9 million and infant deaths over 2.5 million take place in India each year. If hell is paved with infants' skulls, then India must have contributed the most.

With almost no fall in birth rates and slow fall in death rates in the last decade, India's population is growing rapidly at the rate of 2.1 per cent per annum. As a result, net 17 million are added to India's population every year, that is to say, one Bhutan every month, one







Sri Lanka or Nepal or Afghanistan every year and one Bangla Desh or Pakistan every six years.

In Table 1, Asian countries are arranged in ascending order on the basis of infant mortality and corresponding fertility rates are shown. Both rates are distressingly high in India. The infant mortality rate is as high as 97 in 1985 as compared to 5 in Japan, 22 in Malaysia, 29 in Sri Lanka and 33 in China and the total fertility rate is as high as 4.5 in 1984 as compared to 1.7 in Japan, 2.1 in South Korea, 2.4 in China and 2.7 in Sri Lanka. These countries can be divided in 3 groups, i.e. first one with infant mortality rate (IMR) less than 40 and total fertility rate (TFR) less than 3; the second one with IMR between 40-100 and TFR of 4 and 5; and the third one with IMR above 100 and TFR above 5. India belongs to the second group, at least 25 years behind the first group.

Table 2 and Figure 2 show the latest trend of IMR along with its neo-natal and post-natal components during 1976-84 both in rural and urban areas. The disturbing features of this trend are as follows:

- (i) the urban IMR is almost half of rural IMR;
- (ii) the urban IMR declined slightly from 80 in 1976 to 65 in 1980 but stabilized around 65 thereafter;
- (iii) the rural IMR also declined from 139 in 1976 to 119 in 1981 but stabilized around 114 thereafter;
- (iv) neo-natal IMR (of those dying within one month from birth) has not only stabilized in rural areas after 1979 but even increased slightly since 1981 in urban areas.

On the top of it, India is the only country in the world where neo-natal IMR has increased from 68 in 1970 to 80 in 1977 and its share in total IMR from 53 per cent in 1970 to 64 per cent in 1983. Today almost 64 per cent infant deaths take place within one month and





Table 1 : Infant Mortality and Fertility in Asian Countries

| <u>Rank</u> | <u>Country</u> | <u>Infant Mortality Rate</u> | <u>Total Fertility Rate</u> |
|-------------|----------------|------------------------------|-----------------------------|
| 1           | Japan          | 5                            | 1.7                         |
| 2           | Hong Kong      | 8                            | 1.4                         |
| 3           | Singapore      | 9                            | 1.5                         |
| 4           | Malaysia       | 22                           | 3.6                         |
| 5           | South Korea    | 25                           | 2.1                         |
| 6           | Sri Lanka      | 29                           | 2.7                         |
| 7           | China          | 33                           | 2.4                         |
| 8           | Thailand       | 40                           | 2.9                         |
| 9           | Mongolia       | 46                           | 5.0                         |
| 10.         | Phillippines   | 56                           | 4.6                         |
| 11          | Vietnam        | 68                           | 4.3                         |
| 12          | Indonesia      | 75                           | 3.6                         |
| 13          | India          | 97                           | 4.5                         |
| 14          | Burma          | 102                          | 4.3                         |
| 15          | Nepal          | 106                          | 6.0                         |
| 16          | Iran           | 109                          | 5.2                         |
| 17          | Lao            | 111                          | 6.0                         |
| 18          | Bangladesh     | 120                          | 5.6                         |
| 19          | Pakistan       | 120                          | 5.5                         |
| 20          | Kampuchea      | 133                          | 4.8                         |
| 21          | Bhutan         | 135                          | 5.4                         |
| 22          | Afghanistan    | 175                          | 6.7                         |





51 per cent within one week from birth. ||

Table 2 and Figure 2 show infant, neo-natal and post-natal mortality rates in rural and urban areas of India as a whole for 1976-84. The trends are equally disturbing because :

- (i) the infant mortality rate which was gradually coming down upto 1982 is more or less stabilized;
- (ii) the infant mortality rate in rural areas is almost 200 per cent higher than that in urban areas due to relatively poorer socio-economic conditions and maternal and child health care services;
- (iii) the fall in neo-natal mortality which is due to endogenous factors related to maternal and birth processes is rather very slow and insignificant as compared to the fall in post-natal mortality which is due to exogenous factors related to disease, infection, malnutrition and egregious environment.

Table 3 and Figure 3 show statewide trends of infant mortality during 1970-73 to 1982-84 using 3-year averages. During the last 14 years, the slowest fall in infant mortality is recorded in Madhya Pradesh, Orissa and Jammu & Kashmir. During the first six years, the infant mortality rate showed even upward trend in Rajasthan, Haryana, Himachal Pradesh, Punjab and Andhra Pradesh, which subsequently started showing downward trend.

Table 3 and Figure 3 show statewide trends of IMR during 1970-84 using 3 year averages. It shows that :





Table 2 : Infant, neo-natal and post-natal mortality rate in rural and urban areas in India (1976-1984)

| Year | <u>Rural mortality rates</u> |                  |                   | <u>Urban mortality rates</u> |                  |                   |
|------|------------------------------|------------------|-------------------|------------------------------|------------------|-------------------|
|      | <u>Infant</u>                | <u>Neo-natal</u> | <u>Post-natal</u> | <u>Infant</u>                | <u>Neo-natal</u> | <u>Post-natal</u> |
| 1976 | 139                          | 83               | 56                | 80                           | 49               | 31                |
| 1977 | 140                          | 88               | 52                | 81                           | 42               | 39                |
| 1978 | 137                          | 85               | 52                | 74                           | 38               | 36                |
| 1979 | 130                          | 78               | 52                | 72                           | 42               | 30                |
| 1980 | 124                          | 76               | 48                | 65                           | 39               | 26                |
| 1981 | 119                          | 76               | 44                | 63                           | 39               | 24                |
| 1982 | 114                          | 73               | 41                | 65                           | 39               | 26                |
| 1983 | 114                          | 74               | 40                | 66                           | 39               | 27                |
| 1984 | 113                          | 72               | 41                | 66                           | 40               | 26                |





Figure: 1 Infant Mortality Rates in Rural and Urban Areas of India (1976-84)

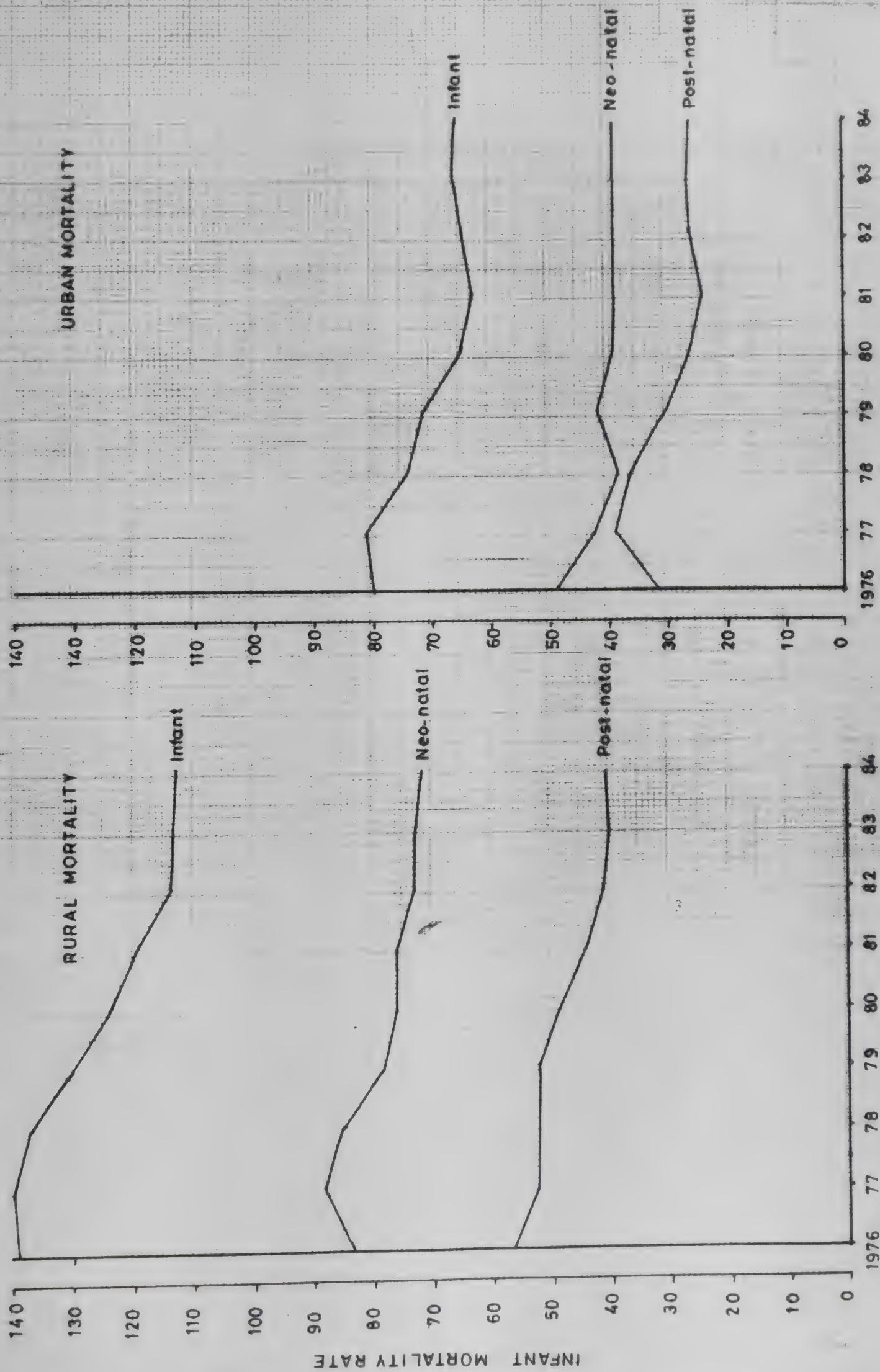






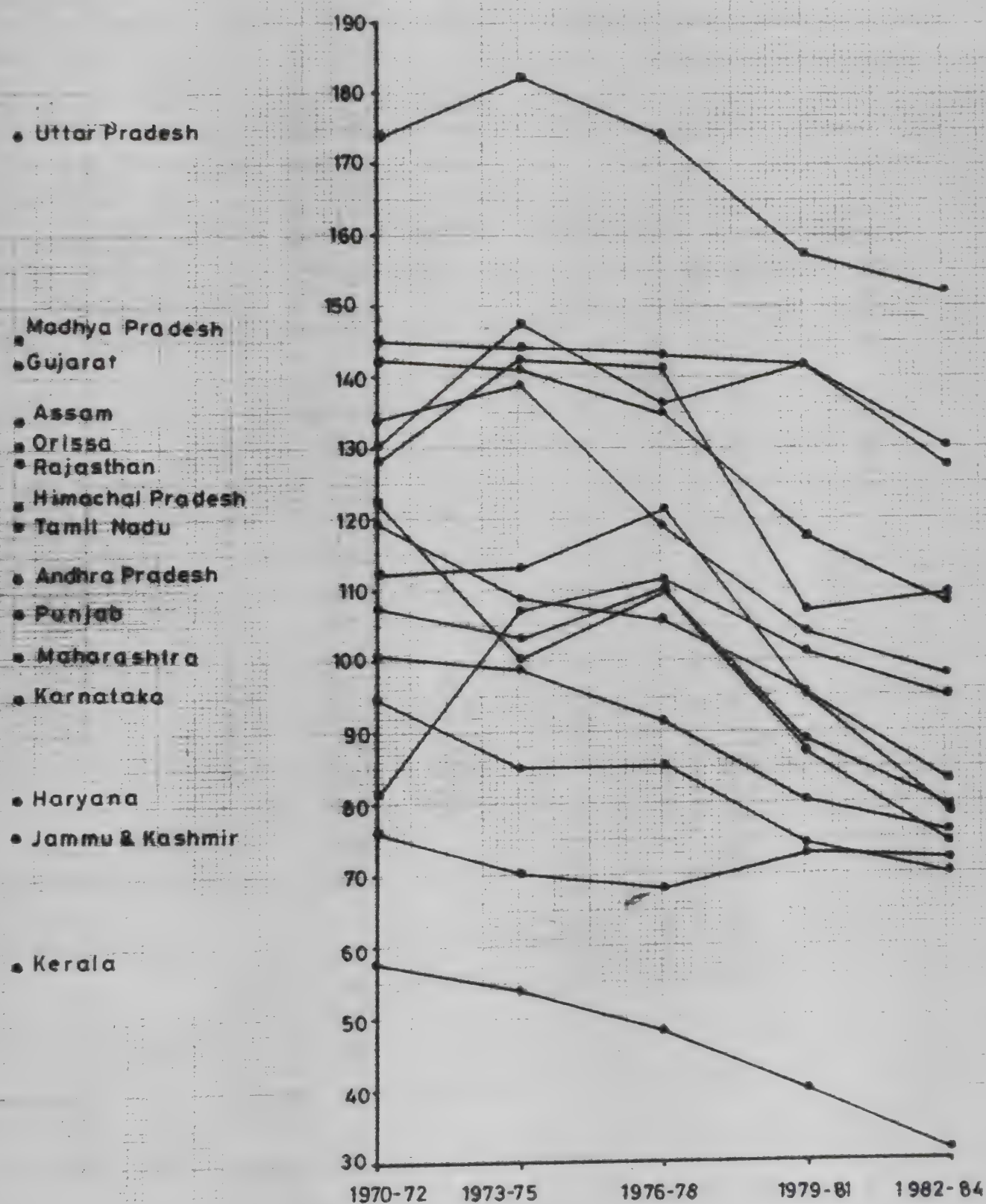
Table 3 : Infant Mortality Rates in Major States  
(1970-72 TO 1985-86)

| State               | 1970-72 | 1973-75 | 1976-78 | 1979-81 | 1982-84 | 1985-86 |
|---------------------|---------|---------|---------|---------|---------|---------|
| 1. Kerala           | 58      | 54      | 48      | 40      | 31      | 83      |
| 2. Karnataka        | 95      | 85      | 85      | 74      | 70      | 110     |
| 3. Jammu & Kashmir  | 76      | 70      | 68      | 73      | 72      |         |
| 4. Punjab           | 107     | 103     | 110     | 87      | 74      |         |
| 5. Maharashtra      | 101     | 99      | 91      | 80      | 75      |         |
| 6. Andhra Pradesh   | 112     | 113     | 121     | 95      | 78      | 83      |
| 7. Himachal Pradesh | 122     | 100     | 110     | 88      | 79      |         |
| 8. Tamilnadu        | 120     | 109     | 106     | 95      | 83      |         |
| 9. Haryana          | 81      | 107     | 111     | 101     | 95      |         |
| 10. Assam           | 134     | 139     | 119     | 104     | 98      | 110     |
| 11. Gujarat         | 142     | 141     | 135     | 117     | 108     |         |
| 12. Rajasthan       | 128     | 142     | 141     | 107     | 109     |         |
| 13. Madhya Pradesh  | 145     | 144     | 143     | 142     | 127     |         |
| 14. Orissa          | 130     | 148     | 136     | 142     | 130     |         |
| 15. Uttar Pradesh   | 174     | 182     | 174     | 157     | 152     |         |
| All India           | 132     | 133     | 129     | 115     | 105     |         |





Figure : 3 Infant Mortality Rates in Indian States (1970-72 to 1982-84 )





- (i) only in Kerala, Karnataka, Maharashtra, Tamil Nadu and Gujarat, the IMR is consistently and steadily declining, but
- (ii) in all other states, the IMR showed upward trend initially followed by some downward trend later on. Only in Jammu and Kashmir, the IMR is rising when in all other states it is falling.
- (iii) after 1975, however, the IMR has shown sharper decline in Himachal Pradesh, Assam, Andhra Pradesh and Punjab as compared to other states.

In Table 4 and Figure 4 and 5, an attempt is made to arrange major states in ascending order on the basis of infant mortality rate and total fertility rate (TFR) and also show how they are changing in rural and urban areas at two points in time, i.e. 1981 and 1985. The following points emerge from them. Out of 17 states for which data are presented:

- (i) the rural IMR is going down in 14 states but increasing in 3 states, i.e. Karnataka, Himachal Pradesh and Jammu & Kashmir;
- (ii) the urban IMR is going down in only 6 states but either remaining static or going up in as many as 11 states;
- (iii) the rural TFR (total fertility rate) is going down in 6 states but either remaining static or going up in 11 states;
- (iv) worse still is the urban TFR which has either remained static or increased in all 17 states.
- (v) both IMR and TFR trends are slightly better in rural areas but extremely disturbing in urban areas needing prompt attention and correction.





Table 4 : Infant Mortality and Total Fertility Rates in Major States

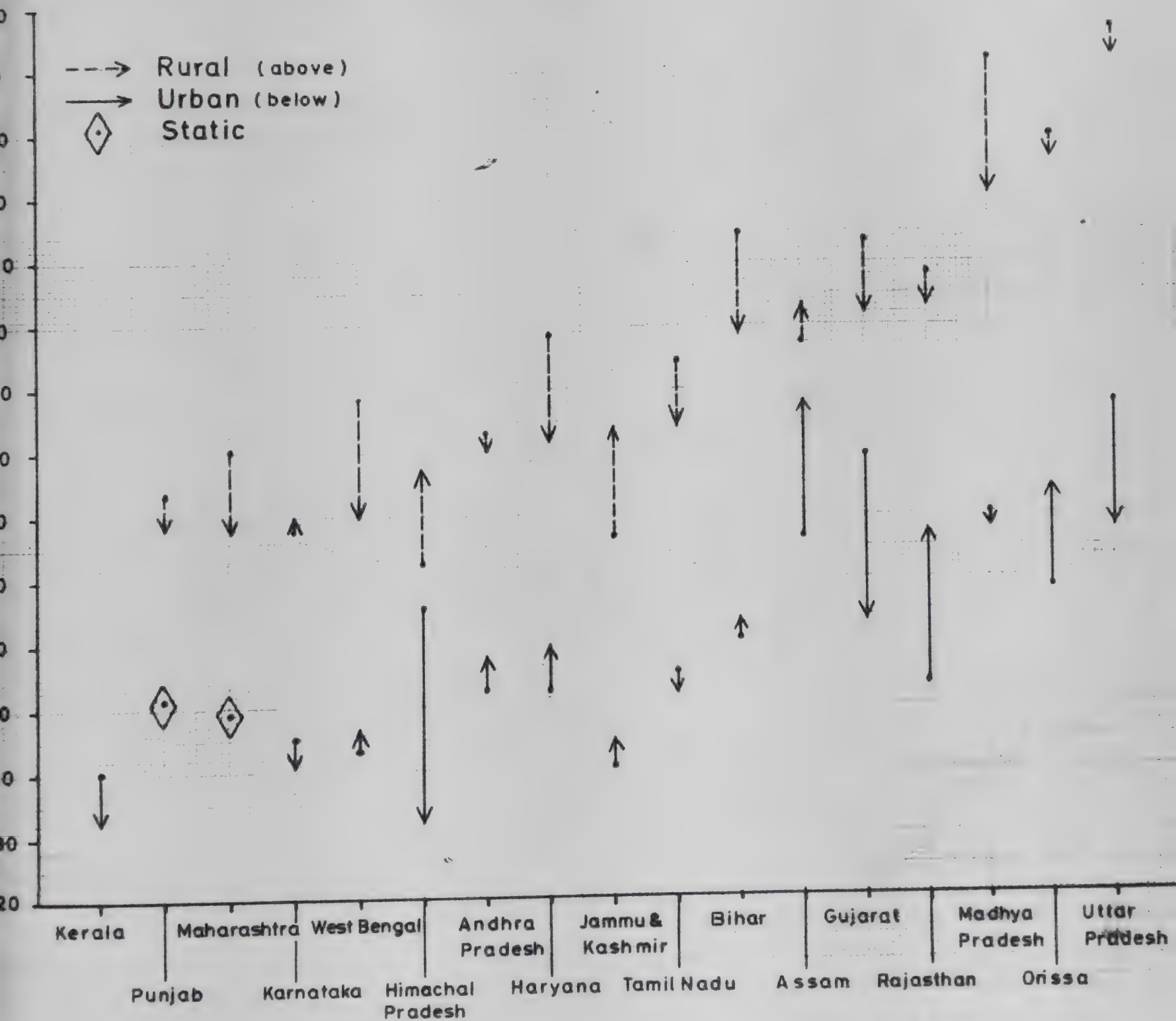
| State               | Infant Mortality Rate (1985) | Total Fertility Rate (1984) | Infant Mortality Rate |       | Total Fertility Rate |       |
|---------------------|------------------------------|-----------------------------|-----------------------|-------|----------------------|-------|
|                     |                              |                             | Rural                 | Urban | Rural                | Urban |
| 1. Kerala           | 31                           | 2.4                         | 32                    | 24    | 2.9                  | 2.4   |
| 2. Maharashtra      | 68                           | 3.8                         | 78                    | 49    | 4.0                  | 3.0   |
| 3. Karnataka        | 69                           | 3.8                         | 80                    | 45    | 3.8                  | 3.0   |
| 4. Punjab           | 71                           | 3.8                         | 78                    | 51    | 4.1                  | 3.4   |
| 5. West Bengal      | 74                           | 3.9                         | 80                    | 44    | 4.8                  | 2.4   |
| 6. Tamilnadu        | 81                           | 3.3                         | 95                    | 55    | 3.7                  | 2.7   |
| 7. Andhra Pradesh   | 83                           | 4.0                         | 90                    | 52    | 4.2                  | 3.0   |
| 8. Himachal Pradesh | 84                           | 3.9                         | 87                    | 65    | 3.9                  | 2.0   |
| 9. Haryana          | 85                           | 5.0                         | 92                    | 52    | 5.3                  | 3.5   |
| 10. Jammu & Kashmir | 85                           | 4.6                         | 93                    | 41    | 5.0                  | 2.5   |
| 11. Gujarat         | 98                           | 4.0                         | 112                   | 89    | 4.6                  | 3.4   |
| 12. Bihar           | 106                          | 5.9                         | 109                   | 60    | 5.8                  | 4.8   |
| 13. Rajasthan       | 108                          | 5.7                         | 114                   | 53    | 5.5                  | 4.2   |
| 14. Assam           | 111                          | 4.3                         | 112                   | 76    | 4.2                  | 2.6   |
| 15. Madhya Pradesh  | 122                          | 5.1                         | 131                   | 80    | 5.5                  | 3.9   |
| 16. Orissa          | 132                          | 4.3                         | 137                   | 68    | 4.3                  | 3.7   |
| 17. Uttar Pradesh   | 142                          | 5.9                         | 154                   | 97    | 6.1                  | 4.1   |
| All India           | 97                           | 4.5                         | 107                   | 62    | 4.8                  | 3.3   |

.. 1 8 8 9 1 ..



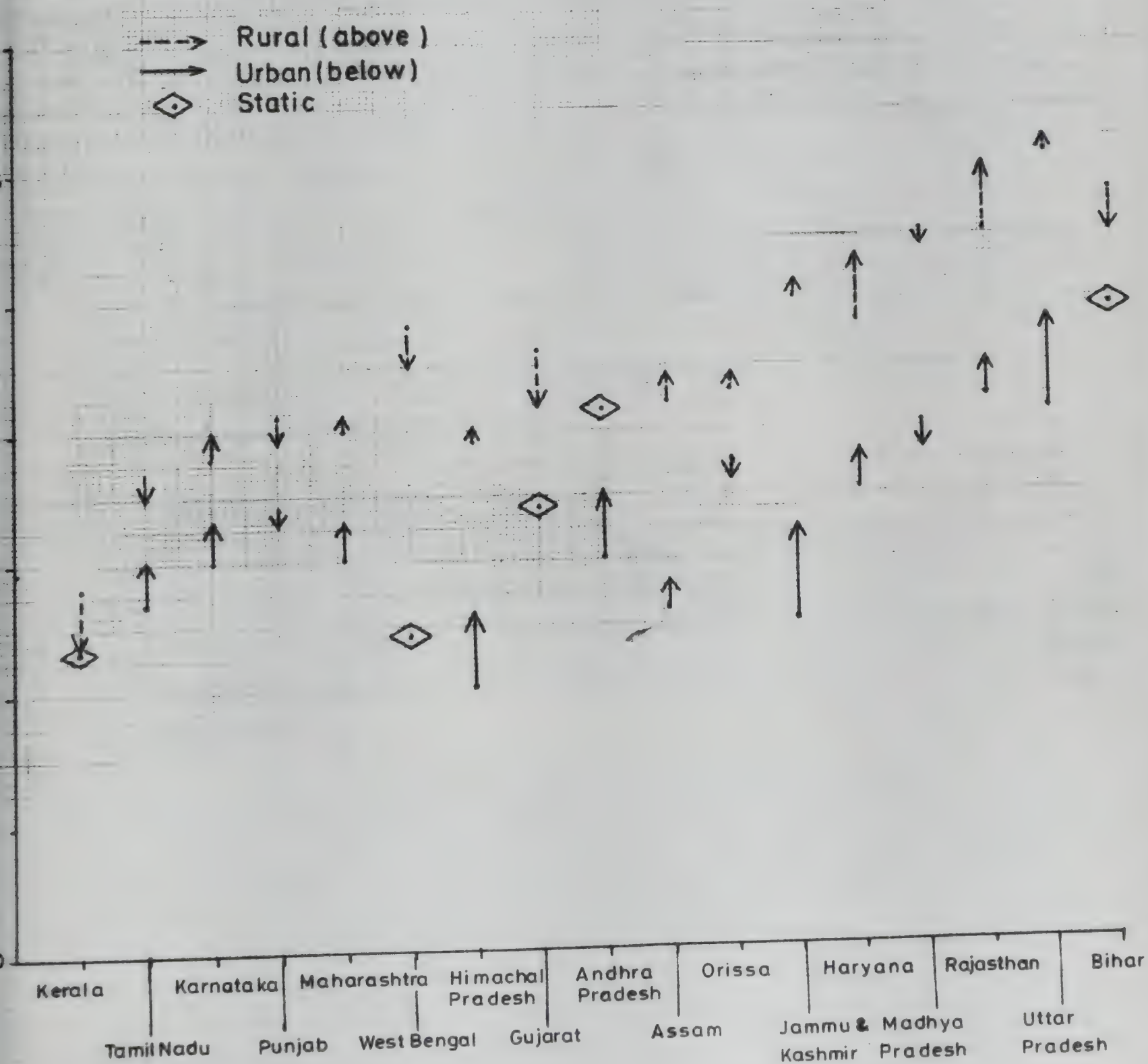


Figure 4 Infant Mortality Rates in Rural and Urban Areas of Major States in India (1981-1985)





re: 5 Total Fertility Rates in Rural and Urban Areas of Major States (1981 - 84)







In Table 5, major 14 Indian states are arranged in ascending order on the basis of IMR and data are presented on TFR and other indicators of development. This brings out that the total fertility rate declines along with the infant mortality rate and both decline as a result of improvements in socio-economic conditions and health and family welfare services. It drives home the simple point that fertility declines only when infant mortality declines which in turn declines only when essential socio-economic conditions and health services improve for the largest possible number ensuring equity. Against this macro-level scene, an attempt is made here to investigate the problem of high infant mortality and fertility at the micro-level to arrive at feasible and replicable solutions which might work and bring down infant mortality and fertility to the lowest level that is possible to achieve with the help of health and social technologies that are already known and must be made available equitably without any loss of time which ultimately means loss of infant lives, i.e. 5 infant deaths out of 50 who are born every minute in India. This is the magnitude and challenge of the problem of high infant mortality and fertility in India.

## 1.2 Purpose of Project:

This project is guided by the concern for high infant mortality and fertility rates and their disturbing trends in the recent past. It is an action-research project genuinely interested in understanding and solving the problem during investigation and intervention phases of about two years each.

During the investigation phase, the purpose of this project was:

- (i) to identify risk factors which impinge on the life of infants directly or indirectly and influence the chances of **their** survival under divergent conditions;





Table 5 : Infant Mortality and Fertility Rates Alongwith other Indicators of Development in Major States

| State          | Popula-<br>tion<br>below<br>poverty<br>line<br>(1983) | Female<br>litera-<br>cy<br>rate<br>(1981) | Nurses<br>per<br>lakh<br>popu-<br>lation<br>(1984) | Profes-<br>sional<br>birth<br>atten-<br>dances<br>(1983) | Mean<br>Age<br>at<br>marr<br>1983<br>(1981) | Couple<br>protec-<br>tion<br>rate<br>(1985) | Total<br>ferti-<br>lity<br>rate<br>(1984) | Infant<br>morta-<br>lity<br>rate<br>(1985) |
|----------------|---|---|--|--|---|---|---|--|
| Kerala         | 27  | 66  | 62   | 74   | 22  | 38  | 2.4                                       | 31   |
| Maharashtra    | 35  | 35  | 46   | 43   | 19  | 52  | 3.8                                       | 68   |
| Karnataka      | 35  | 28  | 17   | 49   | 19  | 33  | 3.8                                       | 69   |
| Punjab         | 14  | 34  | 92   | 68   | 21  | 49  | 3.8                                       | 71   |
| West Bengal    | 39  | 30  | 18   | 34   | 19  | 27  | 3.9                                       | 74   |
| Tamil Nadu     | 40  | 35  | 53   | 57   | 20  | 36  | 3.3                                       | 81   |
| Andhra Pradesh | 36  | 20  | 24   | 47   | 17  | 32  | 4.0                                       | 83   |
| Haryana        | 16  | 22  | 15   | 77   | 18  | 46  | 5.0                                       | 85   |
| Gujarat        | 24  | 32  | 16   | 49   | 20  | 44  | 4.0                                       | 98   |
| Bihar          | 50  | 14  | 11   | 21   | 17  | 17  | 5.9                                       | 106  |
| Rajasthan      | 34  | 11  | 17   | 17   | 16  | 20  | 5.7                                       | 108  |
| Madhya Pradesh | 46  | 16  | 17   | 28   | 17  | 30  | 5.1                                       | 122  |
| Orissa         | 42  | 21  | 13   | 19   | 19  | 33  | 4.3                                       | 132  |
| Uttar Pradesh  | 45  | 14  | 8  | 24   | 18  | 17  | 5.9                                       | 142  |



- (ii) to examine the nexus of relationship between infant mortality and fertility and the manner in which they tend to influence each other and get influenced by other risk factors singly or jointly; and
- (iii) to suggest appropriate interventions to prevent and control risk and bring down infant mortality and fertility simultaneously.

During the intervention phase, the purpose of this project would be:

- (i) to plan and implement appropriate interventions on an experimental or pilot basis in one PHC area in each state already studied with help and cooperation from local organization and government;
- (ii) to monitor and evaluate efficacy and effectiveness of interventions in bringing down infant mortality and fertility; and
- (iii) to determine their feasibility and replicability before they are introduced elsewhere.

With this purpose in view, the project was taken up in 5 states. The risk approach that was followed as a methodological tool; the risk analysis that brings out "at risk" target groups and priorities of interventions suited to different areas; and the summary of results and conclusions based on that are presented for all 5 states in a consolidated and comparative manner in the following chapters. However, the reader is requested to refer to statewise reports for more details and elaborate interpretations. In that sense, this is a condensed and consolidated report based on statistics available for 5 states presented rather briefly for the benefit of scientists and practitioners seriously interested in understanding and solving the problem of high infant mortality and fertility not only in 5 states, but also in other states to the extent findings and suggestions are relevant to them.





## CHAPTER - 2 : METHODOLOGY

### 2.1 Risk Approach

As mentioned earlier the purpose of this project is to identify risk factors and detrimental practices responsible for high infant mortality and fertility and to suggest appropriate interventions to bring down both infant mortality and fertility to the lowest possible level. For this purpose a risk approach, which integrates both medical science and social science approaches, is followed here. This approach involves the following stages which are briefly discussed in this chapter.

- i. **Selection** of population groups living in specific regions or areas which are served by the existing system of health and family welfare services such as hilly, tribal, rural urban and slum areas.
- ii. Enumeration of sample population with a view to identify currently married women in general and those in particular who have had live births in the last two years.
- iii. Collection of basic data about sample population, Health ~~personnel~~ personnel serving that population, health and other complementary facilities and services that are available for the population and the totality of risk factors responsible for infant mortality and fertility.
- iv. Specification of gestation and growth period during which risk factors operate and influence survival chances for the infant, i.e. nine months before and 12 months after child birth.
- v. Identification of categories of risk factors in which the incidence of infant mortality increases significantly.
- vi. Computation of prevalence rate i.e. percent births in risk category; incidence rate i.e. the number of infants dying within one year from birth out of 1000 live births in a year; relative risk i.e. incidence rate of infant deaths in risk category divided by that in non-risk category;





and absolute risk i.e. estimated infant deaths (that could be saved if ~~be saved if~~ risk is totally eliminated) arrived at by multiplying excess relative risk by prevalence rate.

- vii. Identification of 'at risk' target groups needing prompt attention on the basis of relative risk and prioritization of appropriate interventions to be implemented immediately on the basis of attributable risk.

## 2.2 Population Groups

For the purpose of this project it was decided to select hilly and rural areas of Uttar Pradesh, rural and tribal areas of Madhya Pradesh, tribal areas of Orissa, rural and urban areas of Karnataka and slum areas of Bombay. The state-wise list of districts selected in each area is given below:

### List of Districts Selected for the Study

#### A Uttar Pradesh Hilly Districts (3)

1. Pithoragarh
2. Almora
3. Tehri-Garhwal

#### B Rural Districts (5)

1. Banda
2. Basti
3. Sultanpur
4. Rai-Barrielly
5. Etawah

#### Madhya Pradesh

#### Rural & Tribal Districts (10)

1. Chindwara
2. Ratlam
3. Raipur
4. Rajnandgaon
5. Guna
6. Indore
7. Shedole
8. Ujjain
9. Damoh
10. Bastar

#### Orissa

#### Tribal Districts (5)

1. Mayurbhanj
2. Koraput
3. Sundergarh
4. Keonjhar
5. Phulbani

#### Karnataka

#### Rural and Urban areas of districts (5)

1. Tumkur
2. Belgaum
3. Hassan
4. Bidar
5. Raichur

#### Bombay city slums (10)

1. Mukund Nagar
2. Social Nagar
3. Bharat Nagar
4. Golibar
5. Gundavali

6. Majargam
7. Nimani Bagh
8. T.B.Colony
9. Farid Nagar
10. Tembi Pada



# THE IDRC - FPF PROJECT ON INFANT MORTALITY IN RELATION TO FERTILITY







### 2.3 Sample Design

In order to study neo-natal and post-natal infant mortality in each population group separately using risk approach about 250 infant deaths were required for analysis. In order to get 250 cases of deaths about 15,000 households were required to be covered. Depending on the infant mortality rate and time and cost involved in covering required number of households the sample size recommended for various population groups was as follows:

| State/City         | Population groups | Districts/<br>Cities | Block/<br>Charges | Clusters/<br>Villages/<br>Wards | Households |
|--------------------|-------------------|----------------------|-------------------|---------------------------------|------------|
| i. Uttar Pradesh   | Hilly             | 3                    | 6                 | 60                              | 9,000      |
|                    | Rural             | 5                    | 10                | 100                             | 15,000     |
| ii. Madhya Pradesh | Rural (low IR*)   | 5                    | 10                | 100                             | 15,000     |
|                    | Rural (high IR*)  | 5                    | 10                | 100                             | 15,000     |
| iii. Karnataka     | Rural             | 5                    | 10                | 100                             | 15,000     |
|                    | Urban             | 5                    | 10                | 100                             | 15,000     |
| iv. Orissa         | Tribal            | 5                    | 10                | 100                             | 15,000     |
| v. Bombay          | Slums             | 10                   | 10                | 100                             | 15,000     |
| Total              | 8                 | 43                   | 76                | 760                             | 1,14,000   |

\*IR means immunization rate as a proxy to choose relative worse and better districts.

In each state these districts were selected purposively on the basis of highest percentage of that typical population i.e. hilly, tribal, rural, urban and slum while ensuring geographical representation.

In each district/city/slum thus selected, 2 blocks were selected out of which one was with integrated child development services (ICDS). The idea was to select one relatively better and another relatively worse block on the basis of ICDS or equivalent services.





In each block 10 clusters of 150 households were selected randomly for the purpose of enumeration and collection of basic demographic data.

This was the uniform procedure of selecting districts, blocks and clusters of households followed almost uniformly in all 5 states. Only in case of hilly areas of Uttar Pradesh 3 instead of 5 hilly districts were selected and in each block 8 instead of 10 clusters of 150 households were selected due to difficult field conditions having tremendous time and cost implications. In Madhya Pradesh, 5 districts with relatively better and 5 with relatively poorer performance of immunization programme were selected rather than those with highest rural and tribal population, while ensuring regional representation. In analysis, however, they are merged together as the immunization performance was not found to be the discriminating factor.

Sometimes it was difficult to find a compact cluster of 150 households particularly in hilly and tribal districts. In such cases the neighbouring villages or their segments were included in the cluster of 150 households.

#### 2.4 Schedules

Four schedules were designed, pre-tested, modified and finally canvassed to collect the necessary data related to risk factors operating at community, healthworker, household and mother child levels.

Schedule-1 for the community was designed to collect data about the availability of health, education and infrastructural facilities and access to them in kilometers. This was canvassed to local leaders or heads of local organizations such as Panchayat, cooperative or school.

Schedule-2 for the health worker was designed to collect data about personal and social background, education and training, service experience and job satisfaction, tasks performed and training received, correctness of knowledge about risk factors and interventions to tackle them in different situations. This was canvassed to dais, Female Health Guides, Female Multipurpose Workers (ANM), and Health Visitors who normally provide MCH and FP services at community level.



Schedule-3 for household was designed to collect information about all usual resident members of households and their basic characteristics such as name, relation, sex, age, education and marital status and if married then about age at marriage and consumation, children born alive, survived and dies so far and in the last two years. This was canvassed to the head of household or any other knowledgeable person.

Schedule-4 for mothers (who have had live birth in the last two years) was designed to collect information about age, sex, marital status, education, religion, caste, occupation, income, expenditure, material possession, housing, drinking water, sanitation, hygiene, social participation and mass media contacts as distant risk factors. Similarly it was designed to elicit information about socio-economic, cultural, environmental and biological risk factors operating before, during and after the pregnancy for about one year. This was canvassed to every currently married woman if the child was born alive in the last two years but did not survive and to every second alternative woman if the child born in the last two years had survived.

Since the main focus of this project was on infant mortality, each and every case of infant who died and every alternative case of infant who survived was covered for indepth and comparative understanding of risk factors responsible for infant mortality.

Schedule - 4 was comprehensive enough to collect information about all possible known risk-factors operating at pre-natal, natal and post-natal stages.

All these schedules were pretested, item-analyzed and revised in the light of pretest experience and results, expert comments and suggestions, available literature and findings. They were mostly structured, formatted, pre-coded and self-explanatory. The boxes and column numbers were also provided in the left-hand margin to transfer data smoothly and expedite the subsequent work of data entry on floppies and processing and analysis of data on personal computers according to analysis plan.

All printed schedules in required number along with original





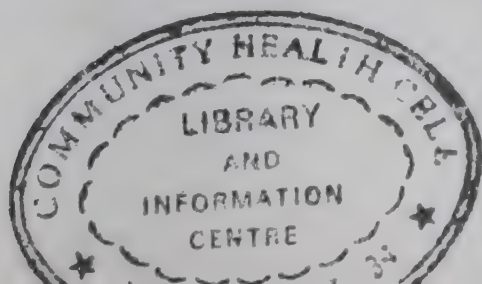
project proposal, instruction manual and analysis of tabulation plan were prepared and finalized jointly by project leaders and advisers, finalized and printed in Delhi and sent to concerned research teams. Sufficiently qualified and experienced investigators were recruited and then trained in the art of selecting sample units, canvassing schedules in local languages, coding and verification for about 8-10 days before they were sent to the field for actual data collection.

Usually one team consisting of 3 investigators and one supervisor was deployed for one district with slight variations due to local field situations and conditions. The filled-in schedules were checked at district and state levels in all respects before they were despatched to Delhi for centralized data processing and analysis according to jointly worked out tabulation plan.

Besides these schedules the team members, particularly supervisors, were also requested to collect qualitative data regarding detrimental cultural practices such as labour, cord and placenta management; pre-lacteal, breast and supplementary feeding and weaning practices; methods of bathing, cleaning, fondling and rocking babies; personal hygiene and cleanliness observed before, during, and after pregnancy; prescriptions and taboos related to food, drink, work, rest and sleep; rituals and rites observed during, before and after pregnancy or child birth; use of traditional, indigenous, herbal, folk and home remedies, medicines and disabilities; child preferences and discriminations entrenched in local customs and traditions; attitudes towards pre, ante and post-natal care and services provided by the modern system, etc. Unfortunately no one was willing and able to collect such useful qualitative information. Luckily some of it was already built-in in the schedules which came rather handy at the time of interpretation of quantitative data.

## 2.5 Data Problems

In spite of best plans, intentions and efforts some data



105/3  
WH-105





problems still remained particularly with those generated by Schedule - 4.

They are as follows:

- i. particulars of the usual resident members of household which were supposed to be transferred from Schedule-3, were not properly transferred;
- ii. history of live births, which was supposed to start from the last live birth or index child in the reverse order was not probed uniformly;
- iii. although medical terms of maternal and childhood diseases were made self-explanatory by giving the description in lay-man's terms and symptoms in brackets, they were not adequately explained at the time of training and systematically probed into at the time of interviewing;
- iv. the list of causes of infant death was elaborate enough so far as fevers, coughs, digestive, nervous, circulatory and general disorders are concerned but not specific enough to record causes peculiar to infancy in one single matrix; and
- v. data related to the history of live births, diseases and cause of death, dietary intake, breast and supplementary feeding and pre and post-natal care received was retrospective in nature and therefore suffers from usual problems of recall and inhibitions.

## 2.6 Range of Variables

Through all these four schedules it was possible to generate data on the following variables having some bearing on infant mortality and fertility directly or indirectly.

### A. Variables related to the region

1. State
2. Type of population group
3. Type of block



B Variables related to locality

1. Size of locality
2. Percent literates
3. Percent SC/ST
4. Health facilities
5. Educational facilities
6. Transport facilities

C Variables related to health personnel

1. Education
2. Training
3. Competence
4. Job-satisfaction
5. Knowledge about risk-factors.

D. Variables related to household

- |  |  |
|--|--|
| 1. Social conditions                     | religion, caste  |
| 2. Economic conditions<br>(rural) garden | land, cattle, poultry, kitchen<br>garden                                 |
| 3. Housing conditions                    | structure, rooms, ventilation,<br>kitchen                                |
| 4. Environmental conditions              | drinking water, drainage, garbage,<br>disposal, defacation, indoor smoke |
| 5. Household assets                      | clothes, mosquito nets, watch,<br>radio, bicycle etc.                    |
| 6. Household income<br>(monthly)         | source, earners, earnings  |
| 7. Household expenditure                 | on food, clothes, education,<br>health etc.                              |

E. Variables related to family

1. Family size
2. Family type
3. Family literacy
4. Family history

F. Variables related to maternal history

1. Age at marriage
2. Age at consumation





3. Age at first pregnancy
4. No. of pregnancies
5. No. of abortions
6. No. of still births
7. No. of multiple births
8. No. of births within 2 year interval
9. No. of births before 18 years of age
10. No. preterm deliveries
11. No. of births after 35 years of age
12. No. of infant deaths (0-1 year)
13. No. of child deaths (1-5 years)
14. No. of complications during pregnancy
15. No. of complications during delivery
16. No. of complications/caesarian sections

G Variables affecting index child at pre-natal, natal and post-natal stages.

1. Birth order
2. Term of pregnancy
3. Sex of child
4. Preceding birth interval
5. Preceding birth complications
6. Maternal diseases during pregnancy
7. Maternal malnutrition during pregnancy
8. Maternal workload during pregnancy
9. Maternal habits during pregnancy
10. Maternal diet during pregnancy
11. Medical attention, health check-up received by mother
12. Ante-natal care received by the mother
13. Immunization received by the mother
14. Duration of labour
15. Type of labour
16. Type of presentation
17. Place of delivery





18. Type of birth attendance
19. Complication at delivery experienced by the mother
20. Complication at delivery experienced by the child
21. Pre-lacteal feeding given to the child
22. Breast
23. Supplementary feeding
24. Health check up for the child
25. Immunization for the child
26. Medical attention received by the child at sickness.

H Variables related to specific outcomes

1. Morbidity status of the child
2. Health status of the child
3. Growth status of the child
4. Neo-natal infant mortality (0-1 month)
5. Post neo-natal infant mortality (2-12 months)
6. Toddler mortality (13-24 months)

I Variables related to fertility behaviour and intentions after the period of infancy

1. Fertility status
2. Ideal spacing between children
3. Ideal no. of children
4. Insurance motive
5. Replacement motive
6. Family Planning intention

## 2.7 Analysis Plan

A detailed tabulation plan was developed for each data set generated by 4 schedules separately in consultation with project leaders and advisors. Once filled-in schedules were received from the field agencies, they were scrutinized and checked before directly entering the data on floppies. After the data were entered on floppies they were again checked and scrutinized before the



actual tabulation and analysis which was done on SIVA-PC-AT computer centrally with the help of programmers and consultants. In order to maintain uniformity in tabulation lots of adjustments and sacrifices were made. Uniform set of tables properly generated and edited according to analysis plan in triplicate, were sent and adequately explained to project leaders personally along with the suggestive outlines for report writing. Statewise and consolidated reports are based broadly on uni-variate and bi-variate analysis, the gist of which is presented in the next chapter.





### CHAPTER-3 : ANALYSIS OF PROFILES

Before going into the analysis of risk factors operating at micro-level, the situation at the macro-level is presented first for better understanding of the processes by which risk factors generally affect infant mortality i.e. profiles of communities and health workers on the basis of data generated through schedules 1 and 2.

#### 3.1 Profile of Communities

The profile of communities surveyed in terms of access to health, education and infrastructural facilities is presented in Table - 3.1.

It is considered as desirable to have various types of facilities within the community itself i.e. trained dai, female health guide, anganwadi or supplementary feeding centre, women's organisation, primary school, non-formal education centre, motorable road and electricity. Out of these, the first four are essential to bring down infant mortality. Karnataka villages are relatively better equipped with these facilities followed by hilly U.P., Orissa, M.P. and rural U.P., the percentage of communities with these facilities varies considerably.

- i. with trained dais, it was less than 30 per cent in U.P., 36 per cent in Orissa, 45 per cent in M.P., and 56 per cent in rural Karnataka,
- ii. with female health guide, it was 10 per cent in M.P., 20 per cent in Orissa and rural U.P., 7 per cent in hilly U.P., and 25 per cent in rural Karnataka,
- iii. with anganwadi or integrated child development services (ICDS), it was 25 per cent in M.P., 47 per cent in rural U.P., 60 per cent in Orissa, 67 per cent in rural Karnataka and 77 per cent in hilly U.P.,
- iv. with women's organisations, it was 21 per cent in M.P., 38 per cent in Orissa, 47 per cent in rural U.P., 51 per cent in hilly U.P. and 56 per cent in Karnataka.



Table 3.1 Percentage Distribution of localities with Access to Health Education and other infrastructural facilities

| Type of Facility                    | Uttar Pradesh |       | Madhya Pradesh | Orissa | Karnataka |       |
|-------------------------------------|---------------|-------|----------------|--------|-----------|-------|
|                                     | Hilly         | Rural |                |        | Rural     | Urban |
| A. Facility within the locality.    |               |       |                |        |           |       |
| i. Untrained dai                    | 77            | 39    | 73             | 75     | 86        | 32    |
| ii. Trained dai                     | 30            | 27    | 45             | 36     | 56        | 47    |
| iii. Female Health Guide            | 17            | 20    | 10             | 20     | 25        | 7     |
| iv. Anganwadi/feeding centre        | 77            | 47    | 24             | 30     | 67        | 42    |
| v. Primary school                   | 85            | 46    | 79             | 70     | 99        | 95    |
| vi. Non-formal education centre     | 64            | 46    | 28             | 30     | 71        | 26    |
| vii. Motorable road                 | 38            | 17    | 40             | 39     | 80        | 100   |
| viii. Women's organization          | 51            | 47    | 21             | 38     | 56        | 56    |
| ix. Electricity                     | 59            | 81    | 72             | 56     | 100       | 100   |
| B. Facility within 5 Kms            |               |       |                |        |           |       |
| i. Female Multipurpose worker (ANM) | 85            | 72    | 64             | 73     | 78        | 98    |
| ii. Health Visitor (MCH/FP)         | 77            | 70    | 46             | 50     | 33        | 73    |
| iii. Sub Health Centre              | 77            | 50    | 65             | 40     | 52        | 6     |
| iv. Registered Medical Practitioner | 67            | 54    | 38             | 26     | 53        | 100   |
| v. Telephone/telegraph office       | 62            | 72    | 41             | 34     | 54        | 99    |
| C. Facility within 10 kms           |               |       |                |        |           |       |
| i. Primary Health Centre            | 85            | 80    | 26             | 61     | 51        | 32    |
| ii. Govt. Hospital                  | 62            | 71    | 43             | 38     | 26        | 100   |
| iii. Private Hospital               | 85            | 75    | 55             | 50     | 64        | 100   |
| iv. Drug store/pharmacist           | 83            | 81    | 48             | 62     | 53        | 100   |
| D. Total No. of localities          | 86            | 112   | 369            | 149    | 105       | 81    |

Note : Data for Bombay slums were not available





- v. with non-formal education centre, it was 28 per cent in M.P., 30 per cent in Orissa, 46 per cent in rural U.P., 64 per cent in hilly U.P., and 71 per cent in Karnataka.

The higher order services ought to be available within 5 kms from the community such as ANM, Health Visitor, SHC and RMP and still higher order services should be available within 10 kms such as PHC, hospital and drug store. Using these distance norms and the percentage of communities within these distance norms, U.P. seems to be better off than Karnataka, and M.P. and Orissa appears somewhere in the middle.

Interestingly, Karnataka which is better equipped with essential grass-root facilities within communities is having the low IMR of 110 and rural Karnataka which is worst equipped with the same is having the highest IMR of 214. Similarly, urban Karnataka which is obviously best equipped with higher order services is having the lowest IMR of 64. What matters most is having essential health and other complementary services within the community itself to bring down infant mortality.

### 3.2 Profile of Health Workers

Among Health Workers trained dai within the community and ANM within 5 kms are the most crucial. Table 3.2 shows that

- i. the percentage of dais who are divorced or widowed was about 15 per cent in U.P., 22 per cent in M.P., and Orissa and 50 per cent in Karnataka.
- ii. except 14 per cent dais in hilly U.P., around 87 per cent dais in rural U.P., and M.P., and 77 per cent in Karnataka were found to be illiterate.

While widowhood and illiteracy retards, training in essential tasks facilitates the performance of dais. Table 3.3 shows the percentage of dais trained in 10 essential tasks which they ought

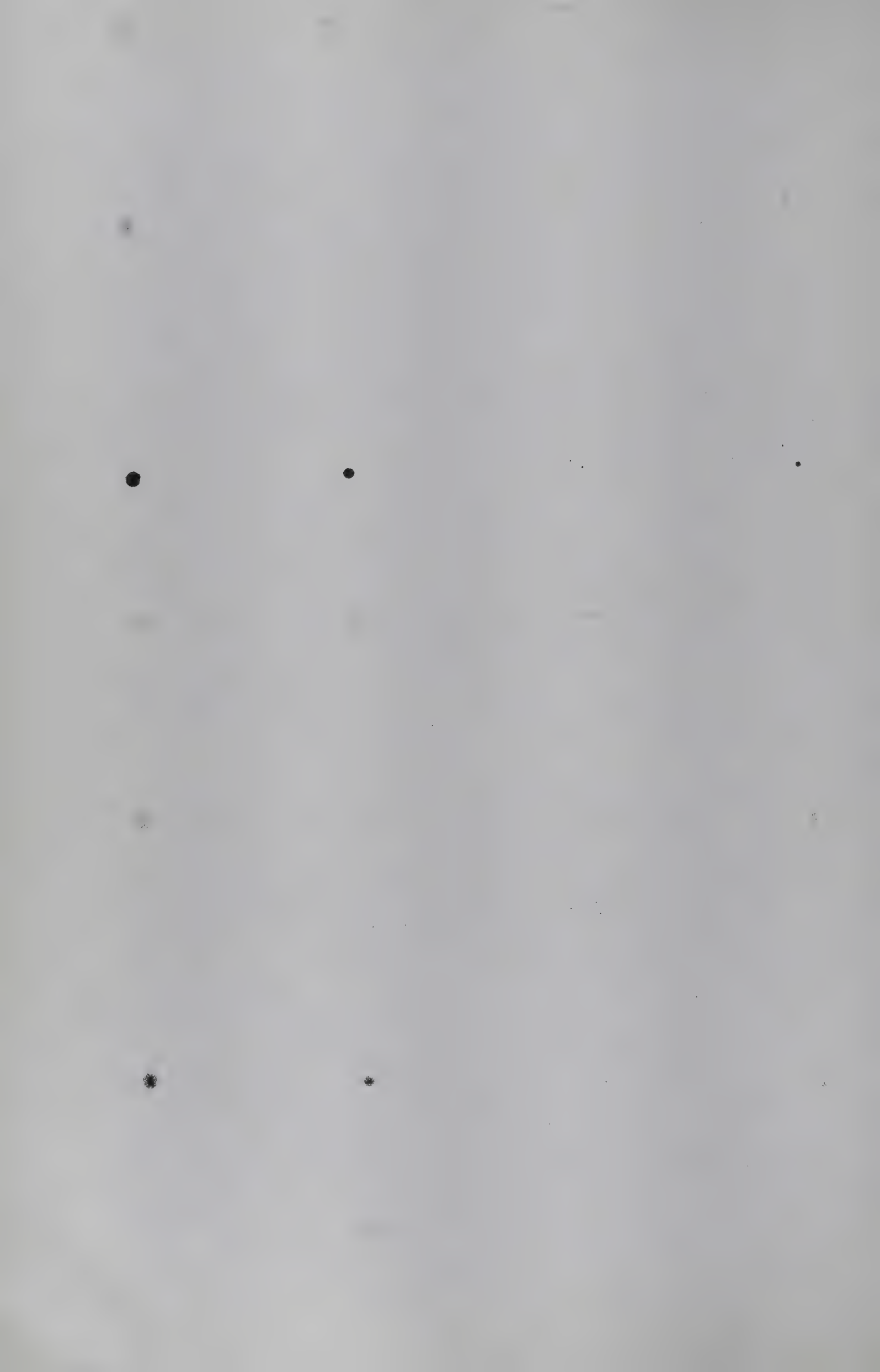


Table 3.2 Profile of Health workers in terms of age, marital status, education and job satisfaction.

| Health worker/characteristic                      | Uttar Pradesh |       | Madhya Pradesh |       | Karnataka |    |
|---|---------------|-------|----------------|-------|-----------|----|
|   | Hilly         | Rural | Orissa         | Rural | Urban     |    |
| A. Dai : Number interviewed                       | 7             | 24    | 197            | 13    | 66        | 21 |
| i. Percent below 30 years                         | 14            | 13    | 17             | 15    | 12        | 5  |
| ii. Percent divorced/separated/<br>widow          | 14            | 17    | 22             | 23    | 50        | 52 |
| iii. Percent illiterate                           | 14            | 88    | 86             | 0     | 77        | 71 |
| B. Health Guide: No. interviewed                  | 5             | 9     | 10             | 4     | 15        | -  |
| i. Percent below 30 years                         | 0             | 67    | 20             | 25    | 7         | -  |
| ii. Percent illiterate                            | 0             | 0     | 10             | 0     | 40        | -  |
| C. ANM : No. interviewed                          | 32            | 50    | 99             | 71    | 81        | 56 |
| i. Percent below 30 years                         | 6             | 50    | 34             | 23    | 41        | 16 |
| ii. Percent educated: matric & above              | 75            | 84    | 73             | 20    | 79        | 82 |
| iii. Percent not satisfied with job<br>conditions |               |       |                |       |           |    |
| - remuneration                                    | 17            | 2     | 25             | 4     | 21        | 45 |
| - equipment                                       | 10            | 2     | 30             | 13    | 21        | 16 |
| - supply of medicines                             | 16            | 4     | 31             | 9     | 32        | 25 |
| - cooperation from people                         | 13            | 4     | 11             | 4     | 5         | 43 |
| - cooperation from seniors                        | 13            | 2     | 18             | 1     | 5         | 2  |

Note : Data from Bombay slums were not available.





Table 3.3 Percentage distribution of dais and AIMS with training received in essential tasks related to maternal and child health care.

| Task   | Uttar Pradesh Madhya Pradesh Orissa |       |         |        | Karnataka |       |     |     |    |     |    |     |
|--|-------------------------------------|-------|---------|--------|-----------|-------|-----|-----|----|-----|----|-----|
|  | Hilly                               | Rural | Pradesh | Orissa | Rural     | Urban |     |     |    |     |    |     |
|  | Dai                                 | AIM   | Dai     | AIM    | Dai       | AIM   | Dai | AIM |    |     |    |     |
| 1. Detection of simple symptoms of diseases & malnutrition | 29                                  | 38    | 29      | 96     | 81        | 99    | 62  | 80  | 32 | 90  | 14 | 95  |
| 2. Identification of "high risk" mothers & infants         | 14                                  | 94    | 46      | 98     | 78        | 97    | 77  | 95  | 33 | 93  | 10 | 96  |
| 3. Performing simple deliveries                            | 29                                  | 91    | 54      | 100    | 60        | 97    | 34  | 83  | 46 | 100 | 24 | 100 |
| 4. Referral of complicated cases                           | 42                                  | 91    | 25      | 80     | 68        | 91    | 92  | 90  | 32 | 93  | 14 | 100 |
| 5. Immunization of mothers & infants                       | 14                                  | 91    | 29      | 98     | 86        | 100   | 84  | 97  | 41 | 100 | 14 | 93  |
| 6. Oral rehydration treatment & diarrhoea                  | 29                                  | 91    | 21      | 94     | 83        | 98    | 69  | 90  | 36 | 96  | 23 | 96  |
| 7. Monitoring growth of child in terms of height & weight  | 14                                  | 94    | 29      | 98     | 71        | 100   | 77  | 94  | 46 | 95  | 14 | 96  |
| 8. Propagation of breast & supplementary feeding           | 29                                  | 91    | 13      | 100    | 79        | 100   | 69  | 87  | 23 | 100 | 24 | 98  |
| 9. Propagation of personal and environmental hygiene       | 14                                  | 84    | 21      | 98     | 73        | 98    | 69  | 90  | 27 | 100 | 19 | 96  |
| 10. Propagation of birth spacing & birth control           | 29                                  | 91    | 21      | 98     | 82        | 100   | 77  | 97  | 30 | 99  | 19 | 98  |



to perform. In terms of this training, M.P., is the best followed by Orissa, Karnataka and U.P. This probably is the reason why M.P. has the lowest IMR of 96.

In addition to training, an attempt was also made to find out the extent to which dais have correct knowledge about risk factors and situations. Table 3.4 shows that dais in Karnataka are the best in this respect followed by Orissa, M.P. and U.P.

The profile of female multipurpose worker or ANM in terms of education training and knowledge about risk factors is also presented in the same table. They show that:

- i. about 80 per cent ANMs are educated upto or above matric in U.P., M.P. and Karnataka except 20 per cent in Orissa;
- ii. above 70 per cent of them are trained in all essential tasks in all states, but the fact that around 10 per cent are still untrained in the tasks they perform is disturbing enough to emphasise the importance of such training.
- iii. inspite of their education and training, their knowledge about risk factors is far from satisfactory. It is poorest in U.P., in general and hilly U.P., in particular. It is also comparatively poorer in all states with regard to the introduction of semi-solid food and feeding during the attack of diarrhoea, which are so crucially related to post-natal mortality.
- iv. ANMs in M.P. and Karnataka, where the IMR is lowest, are found to be relatively more dissatisfied (i.e. 20-30-per cent) with remuneration, equipment and supply of medicines as compared to other states.





Table 3.4 Percentage distribution of Dais, & ANMs indicating Correct Knowledge.

| Item   |     | Uttar Pradesh |       | Madhya Pradesh | Orissa | Karnataka |       |
|--|-----|---------------|-------|----------------|--------|-----------|-------|
|  |     | Hilly         | Rural |                |        | Rural     | Urban |
| 1. What type of pregnant woman is considered "at risk"?                        | Dai | 86            | 50    | 61             | 85     | 85        | 67    |
|  | ANM | 91            | 90    | 90             | 93     | 89        | 96    |
| 2. How many Tetanus toxoid injections should be given to a pregnant woman?     | Dai | 71            | 63    | 52             | 92     | 88        | 19    |
|  | ANM | 91            | 98    | 96             | 94     | 99        | 100   |
| 3. Is it normal if the weight of the child remains the same at 2 and 4 months? | Dai | 71            | 46    | 73             | 62     | 91        | 38    |
|  | ANM | 68            | 80    | 97             | 86     | 93        | 95    |
| 4. At what age the child should be given semi-solid food?                      | Dai | 29            | 33    | 51             | 85     | 91        | 14    |
|  | ANM | 41            | 46    | 77             | 62     | 52        | 80    |
| 5. At what age the child should be given DPT doses?                            | Dai | 29            | 33    | 51             | 85     | 91        | 14    |
|  | ANM | 41            | 62    | 95             | 84     | 96        | 89    |
| 6. Should the child be fed during an attack of diarrhoea?                      | Dai | 43            | 25    | 67             | 85     | 94        | 53    |
|  | ANM | 41            | 34    | 76             | 92     | 85        | 95    |

Note : Data for Bombay Slums were not available.



## CHAPTER - 4 : ANALYSIS OF RISK FACTORS

### 4.1 Analysis Strategy

The macro-level analysis of profiles of communities, health workers and population groups was presented briefly in earlier chapter. Now, micro-level analysis of risk factors is presented in this chapter. This analysis involves 4 steps.

1. Specification of stages in relation to the life of infant during which certain episodic, personal and environmental risk factors trigger off morbidity and precipitate mortality rather prominently i.e.
  - i) pre-conception stage involving previous fertility history
  - ii) prenatal stage involving the first 7 months of pregnancy
  - iii) peri-natal stage involving last 2 months of pregnancy and the first week after child birth
  - iv) Post-natal stage involving one year of infancy after peri-natal stage
  - v) Post-infancy stage involving fertility behaviour and intentions
  - vi) Parental stage involving the whole period mentioned above, and even extending beyond that.
2. Identification of risk factors operating at each stage and influencing infant mortality, directly or indirectly, singly or jointly, cumulatively or synergically.
3. Calculation of prevalence and incidence rates and relative and attributable risks associated with each factor.
4. Selection of appropriate interventions for different population groups on the basis of calculations indicated earlier.





Risk factors and possible interventions at each stage are listed below followed by the analysis of risk factors in the same sequence.

List of Risk Factors and Interventions by Stages

| <u>Stage (period)</u>                                       |     | <u>Risk Factors</u>   |     | <u>Interventions</u>              |
|---|-----|---|-----|-----------------------------------|
| 1. Pre-conception stage<br>(Before the index child is born) | 1.1 | Mother's age at child birth<br>- below 18 years<br>- above 35 years | 1.1 | Pre-conception counselling        |
|   | 1.2 | Grand multi-parity (more than 2)                                    | 1.2 | Contraceptive advice and services |
|   | 1.3 | Preceding birth interval less than 2 years                          |     |                                   |
|   | 1.4 | Previous pregnancy losses   |     |                                   |
|   | 1.5 | Previous pregnancy complications                                    |     |                                   |
|   | 1.6 | Previous use of contraceptives                                      |     |                                   |



|   |      | : - 36 - :                                    |  |
|---|------|---|--|
| <u>ate (period)</u>   |      | <u>Risk Factors</u>                           | <u>Interventions</u>                       |
| Pre-natal stage<br>(during the<br>first 7 months<br>of pregnancy) | 2.1  | Illness during pregnancy                      | 2.1 Screening of "high-risk pregnant women |
|   | 2.2  | Lack of medical care during illness           | 2.2 regular health check-up                |
|   | 2.3  | deterioration in health                       | 2.3 ante-natal care                        |
|   | 2.4  | loss of weight                                | 2.4 immunization                           |
|   | 2.5  | Inadequate dietary intake                     | 2.5 food supplementation                   |
|   | 2.6  | Strenuous work for more than 3 hours in a day | 2.6 IEC on risk factors                    |
|   | 2.7  | Inadequate rest                               | 2.7 maternity benefits                     |
|   | 2.8  | Inadequate sleep                              | 2.8 referral                               |
|   | 2.9  | No registration at clinic                     |  |
|   | 2.10 | No health check-up                            |  |
|   | 2.11 | No tetanus toxoid                             |  |
|   | 2.12 | No iron tablets/<br>folic acid                |  |
|   | 2.13 | Smoking                                       |  |





| <u>age (Period)</u>  | <u>Risk Factors</u>                          | <u>Interventions</u>                     |
|--|--|--|
| Peri-natal stage<br>(during the 8th<br>and 9th month<br>of pregnancy<br>and one week<br>after birth) | 3.1 Labour prolonged<br>for more than 6 hrs. | 3.1 Trained TBA                          |
|  | 3.2 Pre-term delivery                        | 3.2 Safe delivery kit                    |
|  | 3.3 Breech presentation                      | 3.3 labour, placenta,<br>cord management |
|  | 3.4 Surgical delivery                        | 3.4 referral                             |
|  | 3.5 delivery at home                         | 3.5 hospital delivery                    |
|  | 3.6 delivery by TBA                          | 3.6 early detection<br>of risk           |
|  | 3.7 Low-birth weight<br>(less than 2.5 Kg)   | 3.7 supply of blanket/<br>mosquito net   |
|  | 3.8 Antepartum haemorrhage                   | 3.8 Breast-feeding                       |
|  | 3.9 birth related<br>complications           | 3.9 immunization BCG<br>tetanus          |
|  | 3.10 Breast feeding from<br>2nd or 3rd day   | 3.10 Maternal supple-<br>ments           |
|  | 3.11 Cholastrum not<br>given                 | 3.11 follow-up                           |



| <u>Age (period)</u>  | <u>Risk Factors</u>                       | <u>Interventions</u>                   |
|--|---|--|
| Post-natal stage<br>(from the second week after birth to 1 year) | 4.1 Reduced breast-feeding                | 4.1 Breast-feeding                     |
|  | 4.2 Inadequate/late supplementary feeding | 4.2 check-up                           |
|  | 4.3 No immunization                       | 4.3 Self-care                          |
|  | 4.4 suffering from illness                | 4.4 mother craft                       |
|  | 4.5 suffering from malnutrition           | 4.5 IEC on health & nutrition          |
|  | 4.6 Poor health in 1st six months         | 4.6 common medicines                   |
|  | 4.7 Weight loss in 1st six months         | 4.7 oral rehydration therapy           |
|  | 4.8 Growth retarded in 1st six months     | 4.8 Supplementary feeding              |
|  | 4.9 No medical care at birth              | 4.9 Growth monitoring                  |
|  | 4.10 No medical care at complication      | 4.10 maternity benefits                |
|  | 4.11 No medical care at child's illness   | 4.11 immunization                      |
|  | 4.12 No regular health check-up           | 4.12 well-baby clinic                  |
| 5. Post-infancy stage<br>(two years after infancy)               | 5.1 Pregnant after index child            | 4.13 Contraceptive advice and services |
|  | 5.2 No preference for 2-3 children        | 5.1 contraceptive services             |
|  | 5.3 No preference for family planning     | 5.2 IEC on risk factors                |
|  |   | 5.3 No baby bonus                      |





Stage (period)Risk FactorsInterventions

6. Perennial  
stage  
(all the  
time)

- 6.1 unsafe water from pond, river or well
- 6.2 water not filtered before use
- 6.3 open drainage and garbage around the house
- 6.4 open/pit latrine
- 6.5 Insufficient winter clothes
- 6.6 lack of mosquito net
- 6.7 No common medicines at home
- 6.8 Kutcha house
- 6.9 Poor ventilation
- 6.10 Severe indoor smoke
- 6.11 lack of electricity
- 6.12 lack of adequate income
- 6.13 lack of literacy
- 6.14 lack of participation in women's organization

- 6.1 clean filtered water
- 6.2 Environment sanitation
- 6.3 Personal hygiene
- 6.4 Blanket in winter
- 6.5 mosquito net
- 6.6 Common medicines at home
- 6.7 Cross ventilation
- 6.8 smokeless chullah
- 6.9 electrification
- 6.10 Family income supplementation
- 6.11 Hospital fare
- 6.12 Female literacy
- 6.13 Women's organization



The stage-wise analysis of risk factors is presented in a tabular form almost uniformly. In order to understand and interpret the statistical results presented in these tables little elaboration is necessary. On the top of each table, states and population groups are mentioned and on the left, risk factors and risk categories. For each risk category, under each state four figures are presented in a column. The first one refers to prevalence rate (PR) i.e. per cent live births in that category where risk factor is prevalent. The second one refers to incidence rate (IR) i.e. infant deaths per thousand live births in risk category per year. The third one refers to relative risk (RR) i.e. incidence rate of infant mortality in risk category divided by that in non-risk category. The fourth one refers to attributable risk (AR).

The incidence rate (IR) refers to the number of infants dying per thousand live birth in risk category. The relative risk refers to the excess portion of infants dying due to risk as compared to non-risk category. For example if IR is 198 then 98 (198 - 100) times infant deaths are considered as excess deaths due to risk factor. The attributable risk refers to that number of infant deaths which could be saved if risk is totally eliminated.

The relative risk speaks for the importance of risk category and the attributable risk for the overall contribution attributable to risk category if the risk in given population is eliminated. If the relative risk is high but the prevalence rate is low then the net impact will be far less than a situation where relative risk is small but prevalence rate is high. The attributable risk, which takes into account both relative risk and prevalence rate helps us to prioritize risk factors and accordingly interventions as well to eliminate risk. The relative risk, on the other hand, helps us to understand the gravity of risk factor or the danger about which we must be wary and watchful and do something promptly to eliminate it.





A little explanation about the calculation of IR as IMR is necessary. According to the procedure described earlier all live births in the last two were identified. Out of them 100% of those who did not survive and 50% of those who survived were included in the sample. Based on the age of the child, two groups were created i.e. one year old and above. The number in the first group was used as a denominator, and out of them the number of all those who died was used as a numerator for computing IMR. The denominator was adjusted by multiplying the number of non-surviving.

The results of the analysis of risk factors giving prevalence and incidence rates and relative and attributable risk for all sets of risk factors operating at the stages mentioned earlier are presented in Table 4.1 to 4.23. They are self-explanatory and with the clues provided here the intelligent reader can draw conclusions and inferences independently. However, our own conclusions and suggestions are summarized in the next chapter for the benefit of those who do not have time to go through these tables and understand the drama of risk factors.



Table 4.1 : Prevalence Rate (PR), Incidence Rate (IR), Relative Risk (RR) & Attributable Risk (AR) associated with Mother's Age at Child Birth, Parity, preceding birth interval and previous pregnancy losses

|  | U.P.   |       | M.P. Cri- |     | Karnataka |       | Bom-        | All    |
|--|--------|-------|-----------|-----|-----------|-------|-------------|--------|
|  | Elilly | Rural | ssa       |     | Rural     | Urban | bay<br>Slum | States |
| 1. Mother's age at childbirth:<br>below 18:        |        |       |           |     |           |       |             |        |
| PR   | 4      | 6     | 14        | 4   | 6         | 6     | 6           | 9      |
| IR   | 163    | 282   | 101       | 194 | 174       | 55    | 126         | 138    |
| RR   | 132    | 146   | 100       | 98  | 190       | 86    | 184         | 120    |
| AR   | 1      | 3     | 0         | 0   | 5         | -1    | 5           | 2      |
| 2. Mother's age at childbirth:<br>above 35:        |        |       |           |     |           |       |             |        |
| PR   | 40     | 47    | 30        | 37  | 31        | 35    | 52          | 35     |
| IR   | 164    | 225   | 83        | 163 | 128       | 71    | 86          | 135    |
| RR   | 132    | 117   | 82        | 82  | 139       | 110   | 126         | 118    |
| AR   | 15     | 8     | -5        | -7  | 12        | 4     | 8           | 6      |
| 3. Birth order/parity:<br>above two:               |        |       |           |     |           |       |             |        |
| PR   | 34     | 54    | 42        | 31  | 42        | 40    | 50          | 44     |
| IR   | 192    | 236   | 90        | 224 | 126       | 82    | 81          | 137    |
| RR   | 144    | 157   | 132       | 142 | 139       | 133   | 128         | 133    |
| AR   | 15     | 13    | 13        | 13  | 15        | 13    | 8           | 15     |
| 4. Preceding birth interval: less than<br>2 years: |        |       |           |     |           |       |             |        |
| PR   | 42     | 35    | 40        | 43  | 21        | 17    | 33          | 33     |
| IR   | 109    | 149   | 117       | 193 | 133       | 47    | 107         | 145    |
| RR   | 73     | 148   | 166       | 30  | 133       | 67    | 159         | 140    |
| AR   | -11    | 17    | 26        | -30 | 7         | -6    | 19          | 13     |
| 5. Previous pregnancy losses:                      |        |       |           |     |           |       |             |        |
| PR   | 11     | 12    | 7         | 9   | 13        | 4     | 13          | 9      |
| IR   | 568    | 271   | 145       | 145 | 150       | 122   | 105         | 209    |
| RR   | 656    | 132   | 157       | 77  | 143       | 191   | 142         | 181    |
| AR   | 61     | 4     | +         | -2  | 6         | 4     | 5           | 7      |





Table 4.2: Prevalence Rate (PR), Incidence Rate (IR), Relative Risk (RR) and Attributable Risk (AR) associated with mother's sickness, health, loss of weight and smoking during pregnancy

| Risk Factors/Category             |    | Uttar Pradesh |       | Madhya Pradesh | Orissa | Karnataka |       | B'bay Slums | All States |
|-----------------------------------|----|---------------|-------|----------------|--------|-----------|-------|-------------|------------|
|                                   |    | Hilly         | Rural |                |        | Rural     | Urban |             |            |
| Lack of medical care and sickness | PR | 76            | 59    | 46             | 70     | 63        | 62    | 38          | 56         |
|                                   | IR | 329           | 344   | 203            | 365    | 306       | 125   | 157         | 291        |
|                                   | RR | 326           | 223   | 281            | 246    | 387       | 220   | 287         | 332        |
|                                   | AR | 171           | 72    | 83             | 102    | 180       | 74    | 71          | 130        |
| Poor health in general            | PR | 21            | 19    | 11             | 19     | 1         | 1     | 1           | 10         |
|                                   | IR | 230           | 254   | 112            | 226    | 0         | 0     | 0           | 196        |
|                                   | RR | 194           | 125   | 129            | 129    | 0         | 0     | 0           | 169        |
|                                   | AR | 20            | 5     | 2              | 6      | 0         | 0     | 0           | 7          |
| Loss of weight                    | PR | 9             | 17    | 22             | 13     | 10        | 3     | 24          | 14         |
|                                   | IR | 374           | 354   | 153            | 431    | 219       | 220   | 85          | 225        |
|                                   | RR | 320           | 190   | 191            | 289    | 221       | 328   | 171         | 206        |
|                                   | AR | 20            | 15    | 20             | 25     | 12        | 7     | 10          | 15         |
| Smoking                           | PR | 2             | 14    | 12             | 70     | 26        | 9     | 14          | 18         |
|                                   | IR | 167           | 280   | 118            | 200    | 118       | 113   | 104         | 167        |
|                                   | RR | 118           | 138   | 126            | 136    | 110       | 182   | 140         | 145        |
|                                   | AR | 0             | 5     | 3              | 25     | 3         | 7     | 6           | 8          |



Table 4.3 : Prevalence Rate (PR), Incidence Rate (IR), Relative Risk (RR) and Attributable Risk (AR) associated with mother's dietary intake, work, sleep and rest during pregnancy

| Risk Factors/Category           |    | Uttar Pradesh |       | Madhya Pradesh | Orissa | Karnataka |       | B'bay | All    |
|---------------------------------|----|---------------|-------|----------------|--------|-----------|-------|-------|--------|
|                                 |    | Hilly         | Rural |                |        | Rural     | Urban | Slums | States |
| Inadequate dietary intake       | PR | 73            | 94    | 82             | 18     | 89        | 49    | 72    | 77     |
|                                 | IR | 161           | 215   | 100            | 195    | 120       | 75    | 83    | 133    |
|                                 | RR | 178           | 120   | 131            | 139    | 165       | 131   | 127   | 143    |
|                                 | AR | 57            | 19    | 25             | 31     | 52        | 15    | 19    | 33     |
| Strenuous work: more than 3hrs. | PR | 30            | 32    | 13             | 9      | 14        | 9     | 5     | 16     |
|                                 | IR | 117           | 248   | 106            | 179    | 130       | 79    | 47    | 163    |
|                                 | RR | 170           | 145   | 207            | 186    | 121       | 124   | 55    | 163    |
|                                 | AR | 21            | 14    | 14             | 8      | 3         | 2     | -2    | 10     |
| 3. Inadequate rest              | PR | 6             | 14    | 23             | 31     | 22        | 8     | 25    | 19     |
|                                 | IR | 267           | 206   | 96             | 143    | 127       | 132   | 83    | 140    |
|                                 | RR | 203           | 95    | 101            | 190    | 124       | 220   | 55    | 116    |
|                                 | AR | 6             | -1    | 0              | 28     | 5         | 10    | -11   | 3      |
| 4. Inadequate sleep             | PR | 4             | 5     | 23             | 12     | 18        | 3     | 13    | 13     |
|                                 | IR | 263           | 223   | 83             | 375    | 129       | 158   | 82    | 131    |
|                                 | RR | 196           | 105   | 42             | 238    | 123       | 259   | 200   | 107    |
|                                 | AR | 4             | 0     | -13            | 17     | 4         | 4     | 13    | 1      |





Table 4.4: Prevalence Rate (PR) Incidence Rate (IR)  
Relative Risk (RR) and Attributable Risk (AR)  
associated with pre-natal check-up and care  
received by the mother

|   |    | Uttar Pradesh |       | M.P. | Orissa | Karnataka |       | Bom-<br>bay<br>slums | All<br>States |
|---|----|---------------|-------|------|--------|-----------|-------|----------------------|---------------|
|   |    | Hilly         | Rural |      |        | Rural     | Urban |                      |               |
| No registration<br>at clinic            | PR | 71            | 86    | 69   | 58     | 93        | 97    | 19                   | 71            |
|   | IR | 146           | 212   | 99   | 224    | 113       | 66    | 112                  | 133           |
|   | RR | 113           | 96    | 111  | 174    | 149       | 109   | 159                  | 131           |
|   | AR | 9             | -3    | 8    | 43     | 46        | 9     | 11                   | 22            |
| No regular health<br>check-up           | PR | 24            | 58    | 65   | 54     | 15        | 15    | 27                   | 42            |
|   | IR | 182           | 198   | 95   | 227    | 101       | 76    | 97                   | 138           |
|   | RR | 141           | 85    | 97   | 167    | 89        | 117   | 136                  | 121           |
|   | AR | 10            | -9    | -2   | 36     | -2        | 3     | 10                   | 9             |
| No tetanus toxoid<br>received           | PR | 72            | 75    | 62   | 46     | 32        | 21    | 19                   | 50            |
|   | IR | 152           | 228   | 106  | 231    | 113       | 99    | 124                  | 155           |
|   | RR | 136           | 142   | 131  | 201    | 93        | 186   | 201                  | 177           |
|   | AR | 26            | 32    | 19   | 46     | -2        | 18    | 19                   | 39            |
| No iron-tablets/<br>Folic acid received | PR | 70            | 85    | 66   | 49     | 31        | 25    | 22                   | 53            |
|   | IR | 149           | 222   | 104  | 232    | 113       | 98    | 125                  | 153           |
|   | RR | 120           | 135   | 128  | 168    | 104       | 178   | 192                  | 172           |
|   | AR | 14            | 30    | 18   | 33     | 1         | 20    | 20                   | 38            |



Table 4.5 : Prevalence Rate (PR), Incidence Rate (IR), Relative Risk (RR) and Attributable Risk (AR) associated with obstetrical factors

| Risk Factors/Category                                  |    | Uttar Pradesh |       | Madhya Pradesh | Orissa | Karnataka |       | Bihar Slums | All States |
|--|----|---------------|-------|----------------|--------|-----------|-------|-------------|------------|
|  |    | Hilly         | Rural |                |        | Rural     | Urban |             |            |
| 1. Previous pregnancy complications                    | PR | 1             | 5     | 7              | 10     | 11        | 3     | 17          | 7          |
|  | IR | 571           | 247   | 183            | 295    | 150       | 200   | 95          | 177        |
|  | RR | 416           | 117   | 203            | 171    | 142       | 320   | 127         | 148        |
|  | AR | 3             | 1     | 7              | 7      | 5         | 7     | 5           | 3          |
| 2. Incomplete term of pregnancy                        | PR | 17            | 8     | 5              | 4      | 4         | 5     | 6           | 6          |
|  | IR | 168           | 487   | 323            | 667    | 366       | 500   | 356         | 339        |
|  | RR | 123           | 240   | 370            | 387    | 349       | 937   | 534         | 297        |
|  | AR | 4             | 11    | 14             | 12     | 10        | 42    | 26          | 12         |
| 3. Duration of labour for more than 6 hrs              | PR | 45            | 76    | 42             | 58     | 55        | 24    | 23          | 46         |
|  | IR | 197           | 218   | 101            | 222    | 124       | 86    | 77          | 157        |
|  | RR | 205           | 111   | 109            | 168    | 131       | 145   | 98          | 164        |
|  | AR | 47            | 8     | 4              | 39     | 14        | 11    | 0           | 29         |
| 4. Antepartum haemorrhage: birth-related complications | PR | 24            | 35    | 13             | 22     | 39        | 50    | 18          | 27         |
|  | IR | 259           | 282   | 212            | 436    | 189       | 154   | 85          | 193        |
|  | RR | 242           | 146   | 257            | 271    | 205       | 253   | 110         | 181        |
|  | AR | 34            | 17    | 20             | 38     | 41        | 76    | 2           | 22         |





Table 4.6 : Prevalence Rate (PR), Incidence Rate (IR), Relative Risk (RR), and Attributable Risk (AR) associated with obstetrical factors

| Risk Factors/Category                         |    | Uttar Pradesh |       | Madhya Pradesh | Orissa | Karnataka |       | B'bay slums | All States |
|---|----|---------------|-------|----------------|--------|-----------|-------|-------------|------------|
|   |    | Hilly         | Rural |                |        | Rural     | Urban |             |            |
| Abnormal presentation of baby                 | PR | 15            | 10    | 4              | 5      | 4         | 11    | 4           | 7          |
|   | IR | 139           | 244   | 140            | 162    | 315       | 59    | 68          | 155        |
|   | RR | 98            | 116   | 149            | 88     | 308       | 88    | 87          | 128        |
|   | AR | 0             | 2     | 2              | -1     | 9         | -1    | 0           | 2          |
| Surgical/caezarian delivery                   | PR | 7             | 4     | 2              | 3      | 3         | 4     | 3           | 4          |
|   | IR | 208           | 275   | 96             | 220    | 134       | 101   | 86          | 167        |
|   | RR | 152           | 131   | 100            | 119    | 123       | 157   | 110         | 137        |
|   | AR | 4             | 1     | 0              | 1      | 1         | 2     | 0           | 1          |
| Delivery at home                              | PR | 92            | 95    | 94             | 96     | 84        | 28    | 31          | 77         |
|   | IR | 135           | 213   | 96             | 184    | 108       | 104   | 104         | 138        |
|   | RR | 61            | 97    | 100            | 99     | 89        | 203   | 171         | 175        |
|   | AR | -36           | 3     | 0              | -1     | -9        | 29    | 22          | 58         |
| Delivery by Traditional birth attendant (TBA) | PR | 70            | 90    | 86             | 83     | 70        | 24    | 26          | 68         |
|   | IR | 158           | 227   | 113            | 239    | 139       | 124   | 146         | 146        |
|   | RR | 134           | 97    | 145            | 208    | 154       | 234   | 164         | 144        |
|   | AR | 24            | -3    | 39             | 90     | 38        | 32    | 17          | 30         |
| No post-natal check up                        | PR | 86            | 93    | 92             | 70     | 69        | 48    | 64          | 78         |
|   | IR | 158           | 222   | 98             | 208    | 114       | 67    | 73          | 131        |
|   | RR | 438           | 245   | 120            | 161    | 106       | 104   | 43          | 142        |
|   | AR | 289           | 135   | 19             | 43     | 3         | 3     | -54         | 34         |



Table 4.7 : Prevalence Rate (PR), Incidence Rate (IR), Relative Risk (RR) and Attributable Risk (AR) associated with Breast-feeding, Supplementary feeding and immunization

| Risk factors/Category            |    | Uttar Pradesh |       | Madhya Pradesh | Orissa | Karnataka |       | B'bay slums | All States |
|----------------------------------|----|---------------|-------|----------------|--------|-----------|-------|-------------|------------|
|                                  |    | Hilly         | Rural |                |        | Rural     | Urban |             |            |
| Low birth rate:Less than 2.5 kg. | PR | 9             | 18    | 11             | 10     | 16        | 7     | 17          | 13         |
|                                  | IR | 344           | 392   | 244            | 533    | 495       | 419   | 215         | 367        |
|                                  | RR | 282           | 227   | 314            | 359    | 569       | 804   | 327         | 358        |
|                                  | AR | 16            | 22    | 24             | 26     | 75        | 49    | 39          | 34         |
| Birth-related complications      | PR | 34            | 46    | 26             | 40     | 21        | 14    | 9           | 29         |
|                                  | IR | 292           | 316   | 271            | 400    | 286       | 218   | 448         | 319        |
|                                  | RR | 215           | 223   | 500            | 388    | 434       | 594   | 872         | 428        |
|                                  | AR | 39            | 57    | 104            | 115    | 72        | 66    | 69          | 95         |
| Inadequate breast-feeding        | PR | 48            | 38    | 75             | 87     | 26        | 34    | 39          | 59         |
|                                  | IR | 361           | 382   | 315            | 315    | 558       | 171   | 527         | 320        |
|                                  | RR | 397           | 193   | 373            | 201    | 608       | 282   | 761         | 284        |
|                                  | AR | 143           | 35    | 205            | 88     | 132       | 62    | 186         | 107        |
| Inadequate supplementary feeding | PR | 87            | 85    | 93             | 80     | 89        | 63    | 89          | 85         |
|                                  | IR | 152           | 226   | 101            | 216    | 118       | 76    | 85          | 135        |
|                                  | RR | 214           | 163   | 442            | 411    | 248       | 152   | 487         | 218        |
|                                  | AR | 186           | 54    | 318            | 249    | 132       | 33    | 344         | 100        |
| Not immunized-BCG, Polio, DPT    | PR | 93            | 91    | 90             | 75     | 69        | 48    | 64          | 78         |
|                                  | IR | 152           | 227   | 102            | 230    | 134       | 97    | 100         | 146        |
|                                  | RR | 1563          | 340   | 220            | 514    | 234       | 260   | 251         | 328        |
|                                  | AR | 1360          | 218   | 108            | 311    | 92        | 77    | 97          | 178        |





Table-4.8 : Prevalence Rate (PR), Incidence Rate (IR), Relative Risk (RR) and Attributable Risk (AR) associated with Health and Growth Status

| Risk factor/Category                       |    | Uttar Pradesh |       | Madhya Pradesh | Orissa | Karnataka |       | B'bay slums | All States |
|--|----|---------------|-------|----------------|--------|-----------|-------|-------------|------------|
|  |    | Hilly         | Rural |                |        | Rural     | Urban |             |            |
| Poor health status in the first 6 months   | PR | 8             | 15    | 17             | 15     | 15        | 5     | 9           | 13         |
|  | IR | 343           | 521   | 299            | 527    | 345       | 318   | 192         | 371        |
|  | RR | 328           | 318   | 542            | 427    | 491       | 571   | 284         | 423        |
|  | AR | 18            | 33    | 75             | 49     | 559       | 24    | 17          | 42         |
| Suffering from illness                     | PR | 33            | 62    | 53             | 67     | 50        | 36    | 48          | 34         |
|  | IR | 243           | 307   | 171            | 219    | 208       | 137   | 89          | 183        |
|  | RR | 258           | 645   | 570            | 468    | 526       | 570   | 102         | 426        |
|  | AR | 52            | 338   | 249            | 247    | 213       | 169   | 1           | 111        |
| Static/decreasing weight in first 6 months | PR | 21            | 37    | 23             | 19     | 29        | 23    | 50          | 29         |
|  | IR | 418           | 378   | 284            | 548    | 240       | 138   | 121         | 273        |
|  | RR | 617           | 330   | 693            | 539    | 420       | 310   | 354         | 434        |
|  | AR | 109           | 85    | 136            | 83     | 92        | 48    | 126         | 97         |
| Growth faltering in the first 6 months     | PR | 77            | 80    | 76             | 71     | 64        | 68    | 72          | 73         |
|  | IR | 175           | 242   | 108            | 223    | 160       | 79    | 98          | 150        |
|  | RR | 529           | 238   | 190            | 244    | 746       | 207   | 351         | 284        |
|  | AR | 330           | 110   | 363            | 102    | 413       | 73    | 181         | 134        |
| Symptoms of malnutrition                   | PR | 8             | 8     | 4              | 6      | 3         | 2     | 8           | 4          |
|  | IR | 2701          | 492   | 308            | 539    | 548       | 529   | 40          | 394        |
|  | RR | 200           | 245   | 340            | 522    | 531       | 846   | 50          | 339        |
|  | AR | 8             | 12    | 10             | 25     | 13        | 15    | -4          | 10         |



Table 4.9: Prevalence Rate (PR), Incidence Rate (IR), Relative Risk (RR) and Attributable Risk (AR) associated with infection and malnutrition.

| Risk Factors/Category                   |    | Uttar Pradesh |       | Madhya Pradesh | Orissa | Karnataka |       | Bihar | All States |
|---|----|---------------|-------|----------------|--------|-----------|-------|-------|------------|
|   |    | Hilly         | Rural |                |        | Rural     | Urban |       |            |
| Fevers (Malaria, influenza)             | PR | 15            | 24    | 21             | 34     | 21        | 18    | 11    | 14         |
|   | IR | 198           | 169   | 122            | 130    | 75        | 148   | 31    | 120        |
|   | RR | 208           | 352   | 406            | 277    | 191       | 616   | 35    | 279        |
|   | AR | 16            | 60    | 64             | 60     | 19        | 93    | -7    | 25         |
| Coughs (Pneumonia, Bronchitis)          | PR | 5             | 15    | 26             | 15     | 33        | 14    | 17    | 13         |
|   | IR | 235           | 315   | 126            | 189    | 126       | 73    | 89    | 140        |
|   | RR | 249           | 661   | 418            | 404    | 318       | 304   | 102   | 326        |
|   | AR | 7             | 84    | 83             | 46     | 72        | 29    | 0     | 29         |
| Digestive (Gastro-enteritis, dysentery) | PR | 10            | 19    | 24             | 35     | 14        | 13    | 22    | 14         |
|   | IR | 288           | 204   | 139            | 271    | 179       | 123   | 48    | 146        |
|   | RR | 304           | 428   | 463            | 579    | 453       | 512   | 55    | 340        |
|   | AR | 20            | 62    | 87             | 168    | 49        | 54    | -10   | 34         |
| Nervous (convulsions, meningitis)       | PR | 1             | 2     | 2              | 2      | 1         | 2     | 2     | 1          |
|   | IR | 428           | 440   | 345            | 667    | 846       | 363   | 363   | 374        |
|   | RR | 454           | 924   | 1149           | 1422   | 2142      | 1511  | 417   | 870        |
|   | AR | 4             | 16    | 21             | 26     | 21        | 30    | 6     | 8          |
| Circulatory (Anemia etc.)               | PR | 2             | 3     | 3              | 4      | 2         | 2     | 1     | 1          |
|   | IR | 272           | 385   | 205            | 852    | 778       | 556   | 500   | 440        |
|   | RR | 289           | 808   | 682            | 1817   | 1969      | 2308  | 573   | 1023       |
|   | AR | 4             | 21    | 17             | 69     | 37        | 44    | 6     | 10         |
| Other clear symptoms                    | PR | 32            | 17    | 11             | 6      | 5         | 6     | 13    | 6          |
|   | IR | 419           | 564   | 363            | 429    | 619       | 344   | 85    | 383        |
|   | RR | 444           | 1184  | 1206           | 914    | 1562      | 1428  | 97    | 890        |
|   | AR | 110           | 184   | 122            | 49     | 73        | 79    | -1    | 47         |
| Causes peculiar to infancy              | PR | 34            | 46    | 26             | 40     | 21        | 14    | 9     | 29         |
|   | IR | 292           | 316   | 271            | 400    | 286       | 218   | 448   | 319        |
|   | RR | 310           | 658   | 903            | 851    | 715       | 838   | 515   | 742        |
|   | AR | 71            | 257   | 209            | 300    | 129       | 103   | 37    | 186        |
| Symptoms of malnutrition                | PR | 8             | 8     | 4              | 6      | 3         | 2     | 8     | 4          |
|   | IR | 270           | 492   | 308            | 539    | 548       | 529   | 40    | 394        |
|   | RR | 287           | 1025  | 1027           | 1146   | 1370      | 2034  | 46    | 916        |
|   | AR | 15            | 74    | 37             | 63     | 38        | 39    | -4    | 32         |



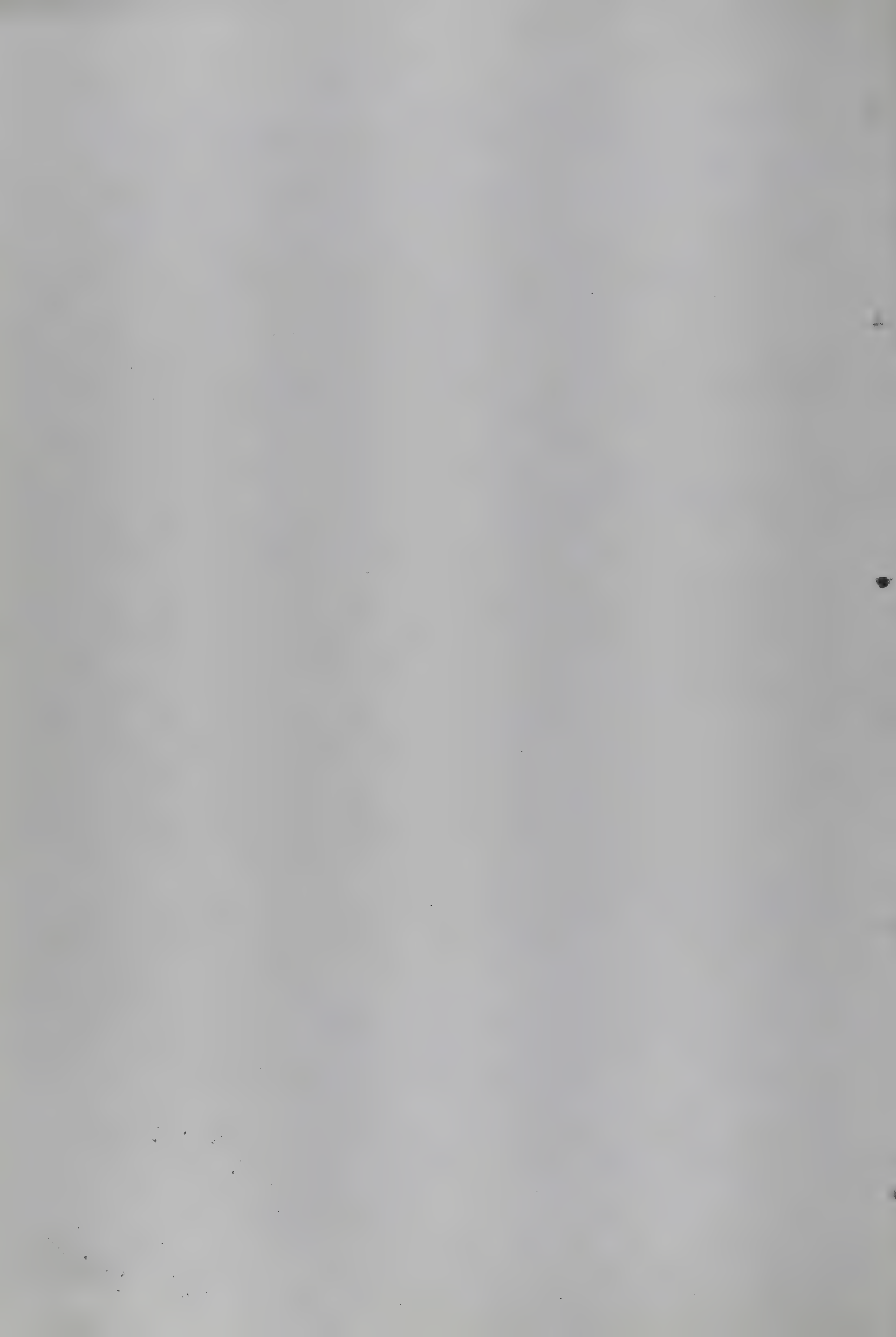


Table 4.10 : Prevalence Rate (PR) Incidence Rate (IR)  
Relative Risk (RR) and Attributable Risk (AR)  
associated with Fertility Behaviour and Intentions

|   |    | Uttar Pradesh |       | M.P. | Orissa | Karnataka |       | Bombay | All    |
|---|----|---------------|-------|------|--------|-----------|-------|--------|--------|
|   |    | Hilly         | Rural |      |        | Rural     | Urban | Slums  | States |
| 1. Contraceptives not used before the index child                     | PR | 45            | 86    | 86   | 97     | 62        | 56    | 87     | 77     |
|   | IR | 156           | 217   | 94   | 94     | 117       | 75    | 78     | 130    |
|   | RR | 108           | 143   | 82   | 78     | 68        | 146   | 133    | 117    |
|   | AR | 4             | 37    | -15  | -21    | -20       | 26    | 29     | 13     |
| 2. Became pregnant after the index child.                             | PR | 6             | 8     | 10   | 8      | 4         | 6     | 7      | 7      |
|   | IR | 258           | 237   | 176  | 295    | 486       | 140   | 125    | 231    |
|   | RR | 293           | 113   | 201  | 175    | 509       | 228   | 364    | 201    |
|   | AR | 6             | 1     | 10   | 6      | 16        | 8     | 18     | 7      |
| 3. Wants more children to ensure that the desired number will survive | PR | 72            | 50    | 58   | 54     | 84        | 57    | 65     | 62     |
|   | IR | 75            | 259   | 112  | 210    | 105       | 78    | 69     | 132    |
|   | RR | 52            | 154   | 152  | 135    | 75        | 159   | 74     | 121    |
|   | AR | -35           | 27    | 130  | 19     | -21       | 34    | -17    | 13     |
| 4. Wants more than 3 children.  | PR | 41            | 59    | 36   | 66     | 39        | 45    | 51     | 51     |
|   | IR | 136           | 224   | 87   | 193    | 127       | 76    | 83     | 133    |
|   | RR | 90            | 122   | 73   | 110    | 117       | 121   | 122    | 107    |
|   | AR | -4            | 13    | -10  | 7      | 7         | 10    | 11     | 4      |
| 5. Does not want any family planning method                           | PR | 6             | 2     | 3    | 2      | 7         | 1     | 2      | 3      |
|   | IR | 186           | 212   | 81   | 273    | 118       | 67    | 29     | 128    |
|   | RR | 139           | 101   | 93   | 162    | 124       | 109   | 85     | 111    |
|   | AR | 2             | 0     | -0   | 1      | 2         | 0     | 0      | 0      |





Table 4.11: Preference for Number of Children and Family Planning Methods

|  |    | U.P.  |       | M.P. | Ori- | Karnataka |       | Bom  | All  |
|--|----|-------|-------|------|------|-----------|-------|------|------|
|  |    | Hilly | Rural |      | ssa  | Rural     | Urban | bay  | Sta- |
|  |    |       |       |      |      |           |       | slum | tes  |
| A. Preference for Boys:                    |    |       |       |      |      |           |       |      |      |
| 1  | 28 | 15    | 10    | 7    | 44   | 34        | 27    | 23   |      |
| 2  | 53 | 50    | 38    | 55   | 43   | 49        | 49    | 51   |      |
| 3  | 14 | 35    | 22    | 39   | 13   | 17        | 24    | 26   |      |
| B. Preference for Girls:                   |    |       |       |      |      |           |       |      |      |
| 1  | 60 | 52    | 38    | 46   | 56   | 53        | 49    | 54   |      |
| 2  | 30 | 34    | 19    | 40   | 33   | 31        | 28    | 31   |      |
| 3  | 10 | 14    | 12    | 14   | 11   | 16        | 23    | 15   |      |
| C. Preference for total children:          |    |       |       |      |      |           |       |      |      |
| 1  | 5  | 2     | 4     | 1    | 10   | 2         | 3     | 4    |      |
| 2  | 20 | 8     | 8     | 6    | 26   | 23        | 17    | 15   |      |
| 3  | 34 | 31    | 21    | 27   | 25   | 29        | 30    | 30   |      |
| 4  | 41 | 59    | 37    | 66   | 39   | 46        | 52    | 51   |      |
| D. Preference for Family Planning Methods: |    |       |       |      |      |           |       |      |      |
| 1.No preference                            | 6  | 2     | 3     | 2    | 7    | 1         | 2     | 3    |      |
| 2.Withdrawal/rhythm                        | 22 | 8     | 15    | 6    | 30   | 25        | 18    | 7    |      |
| 3.Condom/Cream                             | 63 | 77    | 68    | 80   | 58   | 63        | 33    | 68   |      |
| 4.Pills/IUD                                | 4  | 10    | 6     | 10   | 1    | 4         | 4     | 6    |      |
| 5.Tubectomy/<br>Vasectomy                  | -  | 3     | 9     | 1    | 3    | 6         | 13    | 6    |      |





Table 4.12: Prevalence Rate (PR), Incidence Rate (IR), Relative Risk (RR) & Attributable Risk (AR) associated with Drinking Water and Environmental sanitation

|                                  | U.P.  |       | M.P. | Ori-ssa | Karnataka |       | Bom-bay | All States |
|----------------------------------|-------|-------|------|---------|-----------|-------|---------|------------|
|                                  | Hilly | Rural |      |         | Rural     | Urban | Slums   |            |
| Water from pond, river or well:  |       |       |      |         |           |       |         |            |
| PR                               | 63    | 68    | 57   | 88      | 44        | 5     | 2       | 47         |
| IR                               | 163   | 219   | 102  | 194     | 119       | 35    | 24      | 154        |
| RR                               | 155   | 109   | 115  | 173     | 114       | 52    | 30      | 159        |
| AR                               | 35    | 6     | 9    | 64      | 6         | -2    | -1      | 28         |
| Water unfiltered before use:     |       |       |      |         |           |       |         |            |
| PR                               | 91    | 86    | 84   | 95      | 92        | 50    | 75      | 81         |
| IR                               | 148   | 210   | 101  | 186     | 112       | 87    | 90      | 113        |
| RR                               | 178   | 90    | 147  | 121     | 132       | 193   | 205     | 162        |
| AR                               | 71    | -9    | 39   | 20      | 29        | 47    | 79      | 50         |
| Open drainage near the house:    |       |       |      |         |           |       |         |            |
| PR                               | 42    | 39    | 35   | 40      | 39        | 18    | 27      | 34         |
| IR                               | 153   | 227   | 114  | 220     | 108       | 87    | 76      | 145        |
| RR                               | 115   | 111   | 132  | 137     | 94        | 141   | 95      | 128        |
| AR                               | 6     | 4     | 11   | 15      | -2        | 7     | -1      | 10         |
| Garbage disposed near the house: |       |       |      |         |           |       |         |            |
| PR                               | 42    | 40    | 39   | 40      | 47        | 54    | 37      | 39         |
| IR                               | 147   | 229   | 97   | 244     | 120       | 91    | 70      | 137        |
| RR                               | 107   | 113   | 100  | 170     | 117       | 171   | 83      | 119        |
| AR                               | 3     | 5     | 0    | 28      | 8         | 24    | -6      | 7          |
| Pit latrine used:                |       |       |      |         |           |       |         |            |
| PR                               | 91    | 91    | 97   | 93      | 91        | 31    | 11      | 73         |
| IR                               | 142   | 221   | 97   | 134     | 113       | 105   | 51      | 140        |
| RR                               | 102   | 152   | 173  | 83      | 133       | 164   | -       | 143        |
| AR                               | 2     | 47    | 71   | -17     | 30        | 20    | -       | 31         |



Table 4.13: Prevalence Rate (PR), Incidence Rate (IR), Relative Risk (RR) & Attributable Risk (AR) associated with necessities of life and season of delivery

|                              | U.P.  |       | M.P. | Ori- | Karnataka |       | Bom-  | All  |
|------------------------------|-------|-------|------|------|-----------|-------|-------|------|
|                              | Hilly | Rural |      | ssa  | Rural     | Urban | bay   | Sta- |
|                              |       |       |      |      |           |       | slums | tes  |
| Insufficient Winter clothes: | 37    | 56    | 72   | 88   | 76        | 33    | 30    | 57   |
| PR                           | 30    | 56    | 73   | 88   | 76        | 33    | 30    | 57   |
| IR                           | 164   | 248   | 104  | 192  | 112       | 84    | 82    | 142  |
| RR                           | 125   | 147   | 141  | 150  | 106       | 148   | 108   | 142  |
| AR                           | 8     | 26    | 30   | 44   | 5         | 16    | 2     | 24   |
| Lack of mosquito net:        |       |       |      |      |           |       |       |      |
| PR                           | 38    | 64    | 85   | 73   | 74        | 19    | 86    | 67   |
| IR                           | 115   | 239   | 101  | 196  | 114       | 98    | 84    | 133  |
| RR                           | 75    | 198   | 140  | 154  | 119       | 196   | 221   | 160  |
| AR                           | -9    | 63    | 34   | 39   | 14        | 18    | 104   | 40   |
| Lack of common medicines:    |       |       |      |      |           |       |       |      |
| PR                           | 89    | 94    | 92   | 99   | 90        | 53    | 70    | 85   |
| IR                           | 150   | 218   | 99   | 186  | 116       | 76    | 89    | 135  |
| RR                           | 211   | 156   | 148  | X    | 216       | 134   | 168   | 213  |
| AR                           | 99    | 53    | 44   | X    | 104       | 20    | 48    | 96   |
| Delivery in Summer:          |       |       |      |      |           |       |       |      |
| PR                           | 26    | 19    | 15   | 21   | 24        | 27    | 23    | 21   |
| IR                           | 118   | 249   | 142  | 186  | 131       | 51    | 76    | 136  |
| RR                           | 86    | 151   | 160  | 109  | 141       | 82    | 98    | 128  |
| AR                           | -4    | 10    | 9    | 2    | 10        | -5    | -1    | 6    |
| Delivery in Winter:          |       |       |      |      |           |       |       |      |
| PR                           | 47    | 46    | 52   | 38   | 17        | 25    | 39    | 40   |
| IR                           | 154   | 235   | 87   | 209  | 143       | 80    | 81    | 135  |
| RR                           | 113   | 142   | 98   | 127  | 154       | 121   | 105   | 127  |
| AR                           | 6     | 19    | -1   | 10   | 9         | 5     | 2     | 11   |





Table 4.14 : Prevalence Rate (PR) Incidence Rate (IR)  
Relative Risk (RR) and Attributable Risk (AR)  
associated with Housing Conditions.

|                              |    | Uttar Pradesh |       | M.P. | Orissa | Karnataka |       | Bombay | All    |
|------------------------------|----|---------------|-------|------|--------|-----------|-------|--------|--------|
|                              |    | Hilly         | Rural |      |        | Rural     | Urban | Slums  | States |
| Kutcha House                 | PR | 12            | 56    | 75   | 88     | 31        | 14    | 9      | 46     |
|                              | IR | 303           | 221   | 105  | 188    | 114       | 118   | 96     | 149    |
|                              | RR | 223           | 151   | 161  | 244    | 92        | 258   | 183    | 168    |
|                              | AR | 15            | 29    | 46   | 127    | -2        | 22    | 7      | 31     |
| Poor Ventilation             | PR | 45            | 53    | 70   | 88     | 58        | 30    | 68     | 60     |
|                              | IR | 191           | 132   | 97   | 185    | 129       | 81    | 76     | 134    |
|                              | RR | 188           | 121   | 104  | 101    | 156       | 136   | 92     | 125    |
|                              | AR | 40            | 11    | 3    | 1      | 32        | 11    | -5     | 15     |
| Severe indoor smoke          | PR | 11            | 10    | 30   | 46     | 15        | 17    | 4      | 20     |
|                              | IR | 220           | 286   | 100  | 216    | 146       | 65    | 89     | 145    |
|                              | RR | 101           | 137   | 88   | 117    | 137       | 69    | 115    | 112    |
|                              | AR | 6             | 4     | -3   | 8      | 6         | -5    | 1      | 2      |
| Lack of electricity in house | PR | 47            | 95    | 67   | 96     | 60        | 16    | 10     | 58     |
|                              | IR | 174           | 219   | 96   | 189    | 122       | 131   | 59     | 154    |
|                              | RR | 155           | 197   | 100  | 201    | 133       | 243   | 73     | 186    |
|                              | AR | 86            | 94    | 0    | 97     | 20        | 23    | -3     | 50     |



Table 4.15: Prevalence Rate (PR) Incidence Rate (IR)  
Relative Risk (RR) and Attributable Risk (AR)  
associated with Socio-Economic Background  
of child's Parents.

|   |    | Uttar Pradesh |       | M.P. | Orissa | Karnataka |       | Bombay | All    |
|---|----|---------------|-------|------|--------|-----------|-------|--------|--------|
|   |    | Nilly         | Rural |      |        | Rural     | Urban | Slums  | States |
| 1. Working class<br>background :<br>wage labourer                     | PR | 20            | 27    | 47   | 72     | 50        | 23    | 15     | 37     |
|   | IR | 165           | 254   | 120  | 199    | 113       | 118   | 65     | 150    |
|   | RR | 112           | 245   | 293  | 245    | 74        | 215   | 56     | 218    |
|   | AR | 2             | 39    | 91   | 104    | -13       | 26    | -7     | 44     |
| 2. Low Family<br>income : below<br>Rs 500 per month                   | PR | 15            | 51    | 50   | 77     | 56        | 9     | 13     | 40     |
|   | IR | 223           | 256   | 115  | 201    | 120       | 136   | 113    | 116    |
|   | RR | 175           | 152   | 148  | 158    | 123       | 232   | 154    | 173    |
|   | AR | 11            | 27    | 24   | 45     | 13        | 12    | 7      | 29     |
| 3. Illiterate<br>parents of the<br>infant.                            | PR | 10            | 43    | 56   | 61     | 57        | 13    | 21     | 40     |
|   | IR | 156           | 285   | 103  | 198    | 119       | 128   | 99     | 144    |
|   | RR | 100           | 131   | 110  | 132    | 226       | 274   | 154    | 146    |
|   | AR | 0             | 13    | 6    | 19     | 72        | 23    | 11     | 18     |
| 4. Lack of mother's<br>participation in<br>women's organi-<br>sation. | PR | 67            | 98    | 97   | 93     | 95        | 91    | 98     | 93     |
|   | IR | 166           | 215   | 95   | 196    | 101       | 70    | 78     | 127    |
|   | RR | 185           | 200   | 72   | 982    | 91        | 288   | 107    | 156    |
|   | AR | 57            | 98    | -27  | 820    | -9        | 171   | 7      | 52     |





Table 4.16 Reasons for no proper medical attention or care received from the trained medical personnel at birth and sickness

| Occasion                               | U.P.  |       | M.P. | Ori-ssa | Karnataka |       | Bom-bay | All Sta-tes |
|--|-------|-------|------|---------|-----------|-------|---------|-------------|
|  | Hilly | Rural |      |         | Rural     | Urban |         |             |
| A. At sickness during pregnancy:       |       |       |      |         |           |       |         |             |
| i)No sickness/need                     | 96    | 96    | 89   | 97      | 96        | 99    | 94      | 94          |
| ii)Facility not available              | 4     | 2     | 2    | 1       | 1         | 1     | 2       | 2           |
| iii)Doctors not helpful                | -     | 1     | 2    | 1       | 2         | -     | 2       | 2           |
| iv)Poor supply of medicines            | -     | 1     | 5    | 2       | 1         | -     | 2       | 2           |
| v)Other                                | -     | -     | 2    | -       | -         | -     | -       | -           |
| B. At complications during childbirth: |       |       |      |         |           |       |         |             |
| i)No complication/need                 | 78    | 63    | 82   | 65      | 87        | 97    | 99      | 82          |
| ii)Facility not available              | 19    | 25    | 9    | 16      | 8         | 2     | -       | 11          |
| iii)Doctors not helpful                | 2     | 5     | 6    | 4       | 1         | 1     | -       | 3           |
| iv)Poor supply of medicines            | 1     | 5     | 1    | 12      | 2         | -     | -       | 2           |
| v)Other                                | -     | 2     | 2    | 3       | 2         | 1     | 1       | 2           |
| C. At Child's sickness:                |       |       |      |         |           |       |         |             |
| i)No sickness/need                     | 79    | 50    | 68   | 57      | 73        | 96    | 97      | 73          |
| ii)Facility not available              | 17    | 31    | 14   | 29      | 15        | 1     | 1       | 14          |
| iii)Doctors not helpful                | 3     | 8     | 12   | 6       | 4         | 1     | -       | 6           |
| iv)Poor supply of medicines            | -     | 7     | 3    | 2       | 3         | 1     | -       | 4           |
| v)Other                                | -     | 4     | 3    | 4       | 5         | 1     | 2       | 3           |



Table 4.17: Exposure to Personal and Mass Media Contacts for Pre-natal and Post-natal care and Health Information

| Contacts  | U.P.  |       | M.P. | Ori-ssa | Karnataka |       | Bom-bay slum | All Sta-tes |
|---|-------|-------|------|---------|-----------|-------|--------------|-------------|
|   | Hilly | Rural |      |         | Rural     | Urban |              |             |
| A. Personal contacts for ante-natal care:       |       |       |      |         |           |       |              |             |
| i) Dai  | 46    | 33    | 7    | 6       | 9         | 2     | 1            | 13          |
| ii) ANM   | 29    | 11    | 21   | 38      | 66        | 43    | 7            | 28          |
| iii) Govt.Doctor                                | 20    | 8     | 6    | 6       | 17        | 44    | 53           | 20          |
| iv) Private Doctor                              | 10    | 5     | 3    | 4       | 10        | 42    | 13           | 11          |
| B. Personal contacts for post-natal care:       |       |       |      |         |           |       |              |             |
| i) Dai  | 10    | 28    | 7    | 3       | 7         | 3     | 2            | 10          |
| ii) ANM   | 14    | 7     | 8    | 30      | 47        | 36    | 5            | 18          |
| iii) Govt.Doctor                                | 5     | 8     | 7    | 5       | 11        | 12    | 27           | 13          |
| iv) Private Doctor                              | 11    | 5     | 5    | 4       | 7         | 29    | 11           | 9           |
| C. Mass-media contacts for Health Informa-tion: |       |       |      |         |           |       |              |             |
| i) Radio  | 85    | 39    | 28   | 14      | 49        | 77    | 36           | 43          |
| ii) Television                                  | 10    | 1     | 3    | 1       | 1         | 27    | 30           | 9           |
| iii) Newspaper                                  | 13    | 3     | 3    | 1       | 8         | 48    | 15           | 12          |
| iv) Films                                       | 6     | 4     | 5    | 1       | 27        | 79    | 15           | 18          |
| v) Posters                                      | 12    | 2     | 14   | 2       | 33        | 61    | 17           | 19          |





ble 4.18 : Significant Correlates of Monthly Household Income i.e. Access to Resources and Health Services

| Correlates                        | U.P.  |       | M.P. | Ori-ssa | Karnataka |       | Bom-bay slums | All States |
|-----------------------------------|-------|-------|------|---------|-----------|-------|---------------|------------|
|                                   | Hilly | Rural |      |         | Rural     | Urban |               |            |
| Access to resources               |       |       |      |         |           |       |               |            |
| i) Caste                          | .15   | .20   | .10  | .11     | .12       | .10   |               | .23        |
| ii) Housing                       |       | .36   | .19  | .10     | .26       | .25   | .08           | .41        |
| iii) Clothing                     |       |       | .26  | .10     | .28       | .20   |               | .26        |
| iv) Sanitation                    |       | .22   | .12  |         | .09       |       | .10           | .24        |
| v) Drinking water                 | .12   |       | .12  |         | .10       | .20   | .16           | .21        |
| vi) Education                     | .20   | .28   | .22  |         | .22       | .30   | .08           | .36        |
| vii) Health Information           | .18   | .27   | .22  | .16     | .20       | .28   | .12           | .38        |
| Access to modern Health Services  |       |       |      |         |           |       |               |            |
| i) Antenatal care for mother      |       | .16   | .09  | .23     | .08       |       | .09           | .16        |
| ii) Medical attention at birth    | .21   | .25   |      | .11     | .20       | .26   |               | .32        |
| iii) Post-natal care for child    |       | .18   | .10  |         |           | .25   |               | .25        |
| iv) Medical attention at sickness |       | .14   |      | .15     | .11       | .10   |               | .15        |

Note: Insignificant correlation coefficients are not mentioned.



Table 19 : Determinants of Infant Mortality Indicated by Beta Coefficients significant at  $> 2.0$  T-Value

| Determinant                                  | U.P.  |       | M.P. Cri-ssa | Karnataka |       | Bom-bay slum | All Sta-tes |
|--|-------|-------|--------------|-----------|-------|--------------|-------------|
|  | Hilly | Rural |              | Rural     | Urban |              |             |
| 1. Child's growth status                     | -.20  | -.16  | -.13         |           |       |              | -.11        |
| 2. Child's general health                    | -.08  | -.18  | -.16         | -.12      | -.20  |              | -.14        |
| 3. Child's malnutrition (Symptoms)           | .11   | .10   |              | .11       | .12   |              | .03         |
| 4. Child's immunization (given)              | -.12  | -.12  | -.08         | -.19      | -.13  | -.19         | -.12        |
| 5. Supplementary feeding (duration)          | -.19  | -.16  | -.29         | -.33      |       | -.11         | -.17        |
| 6. Breastfeeding (duration)                  |       | -.08  |              |           | -.17  | -.21         | -.08        |
| 7. Low birth weight                          |       | .07   |              | .13       |       |              | .06         |
| 8. Traditional birth attendant               |       |       |              | .12       | .10   | .08          | .07         |
| 9. Labour complications                      |       | .05   |              | .10       | .09   |              | .04         |
| 10. Physical strain during pregnancy         | .23   |       |              | .10       | .09   |              |             |
| 11. Dietary intake during pregnancy          |       |       | -.12         | -.10      |       |              |             |
| 12. Mother's general Health during pregnancy | -.11  |       |              | -.08      |       |              |             |
| 13. Contraceptives used before pregnancy     |       | -.05  | -.06         |           | -.07  | -.09         | -.06        |
| 14. Birth order/parity                       |       | -.07  |              |           | .12   |              | .05         |
| 15. Preceding birth interval                 |       |       |              |           | -.08  | -.09         | -.06        |
| 16. Organizational participation             |       |       |              | -.16      | -.11  |              | -.10        |
| 17. Sanitation                               |       | -.05  |              |           | -.08  |              |             |
| 18. Child's age                              |       | .06   | -.23         | .08       |       |              | -.15        |
| 19. Multiple R                               | .51   | .43   | .62          | .62       | .48   | .48          | .42         |

Note: Insignificant factors are deleted for parsimony.





Table 4.20 : Percentage distribution of mothers having inadequate dietary intake of different food items

| Food (Below recommendation)        | Uttar Pradesh<br>Hilly | Uttar Pradesh<br>Rural | Madhya Pradesh | Orissa<br>Tribal | Karnataka<br>Rural | Karnataka<br>Urban | Bombay<br>slums | All States |
|------------------------------------|------------------------|------------------------|----------------|------------------|--------------------|--------------------|-----------------|------------|
| Cereals (upto 9 chapaties)         | 46                     | 41                     | 55             | 36               | 32                 | 26                 | 52              | 37         |
| Pulses (upto 3 bowls)              | 40                     | 41                     | 50             | 32               | 33                 | 17                 | 61              | 35         |
| Leafy vegetables (Upto 2 bowls)    | 41                     | 46                     | 60             | 37               | 35                 | 28                 | 63              | 46         |
| Other vegetables (upto 1 bowl)     | 43                     | 57                     | 66             | 39               | 36                 | 23                 | 55              | 50         |
| Roots & tubers (upto 1 bowl)       | 45                     | 68                     | 71             | 55               | 42                 | 30                 | 77              | 59         |
| Milk (upto 1 cup)                  | 48                     | 61                     | 79             | 79               | 49                 | 49                 | 72              | 65         |
| Fat/Oil (upto 1 tea spoon)         | 65                     | 66                     | 72             | 79               | 51                 | 49                 | 64              | 65         |
| Sugar/Jaggery (upto 1 tea spoon)   | 44                     | 64                     | 68             | 79               | 47                 | 43                 | 49              | 58         |
| Eggs (in a week) upto 6            | 73                     | 94                     | 94             | 76               | 80                 | 61                 | 83              | 84         |
| Meat/fish (in a week) upto 200 kg. | 72                     | 93                     | 82             | 88               | 65                 | 59                 | 72              | 77         |



Table 4.21

Percentage Distribution of Mothers affected by the  
symptoms of diseases and malnutrition

| Symptoms of disease/<br>malnutrition           | <del>Uttar Pradesh</del> |       | Madhya<br>Pradesh | Orissa | Karnataka |       | Bombay | All<br>States |
|--|--------------------------|-------|-------------------|--------|-----------|-------|--------|---------------|
|  | Hilly                    | Rural |                   |        | Rural     | Urban | Slums  |               |
| A During pregnancy                             |                          |       |                   |        |           |       |        |               |
| 1 previous pregnancy<br>loses                  | 11                       | 12    | 7                 | 9      | 13        | 4     | 13     | 9             |
| 2 previous pregnancy<br>complications          | 1                        | 5     | 7                 | 10     | 11        | 3     | 17     | 7             |
| 3 Palour                                       | 63                       | 41    | 41                | 58     | 53        | 58    | 30     | 47            |
| 4 Oedema                                       | 1                        | 5     | 1                 | 3      | 1         | 1     | 2      | 2             |
| 5 Convulsions                                  | 5                        | 6     | 2                 | 3      | 4         | 1     | 4      | 3             |
| 6 Malaria                                      | 15                       | 3     | 1                 | 1      | 1         | 2     | 1      | 3             |
| 7 German Measles                               | 8                        | 8     | 5                 | 5      | 3         | 1     | 1      | 4             |
| 8 Heart disease                                | 1                        | 0     | 1                 | 4      | 0         | 0     | 4      | 1             |
| 9 Tuberculosis                                 | 1                        | 1     | 0                 | 3      | 2         | 1     | 1      | 1             |
| 10 Diabetes                                    | 0                        | 1     | 0                 | 0      | 1         | 0     | 0      | 0             |
| 11 Renal infection                             | 0                        | 1     | 0                 | 1      | 1         | 0     | 1      | 0             |
| 12 Hypertension                                | 0                        | 0     | 0                 | 1      | 1         | 0     | 0      | 1             |
| 13 Anaemia                                     | 3                        | 2     | 0                 | 0      | 0         | 0     | 0      | 1             |
| 14 Accident/injury                             | 9                        | 8     | 5                 | 6      | 8         | 4     | 6      | 6             |
| 15 Poor health                                 | 21                       | 19    | 11                | 19     | 1         | 1     | 1      | 10            |
| 16 Lose of weight                              | 9                        | 17    | 22                | 13     | 10        | 3     | 14     | 14            |
| B During delivery                              |                          |       |                   |        |           |       |        |               |
| 1 Excessive bleeding before<br>onset of labour | 18                       | 16    | 4                 | 10     | 8         | 5     | 2      | 8             |
| 2 Excessive bleeding after<br>delivery         | 16                       | 25    | 10                | 17     | 36        | 48    | 11     | 22            |
| 3 Rupture of perineal<br>region                | 1                        | 3     | 1                 | 7      | 1         | 4     | 7      | 3             |
| 4 On-set labour before 8<br>months             | 17                       | 8     | 5                 | 4      | 4         | 5     | 6      | 6             |
| 5 Prolonged labour for more<br>than 6 hrs      | 55                       | 24    | 58                | 42     | 47        | 76    | 77     | 54            |
| 6 Breech presentation                          | 15                       | 10    | 4                 | 5      | 4         | 11    | 4      | 7             |
| 7 Traditional birth<br>attendant               | 76                       | 92    | 87                | 93     | 72        | 24    | 27     | 70            |









Table 4.23 : Percentage Distribution of Infants by Morbidity, Malnutrition, Poor Health and Delayed Growth Status

| Status                             | Uttar Pradesh<br>Hilly | Pradesh<br>Rural | M.P. | Orissa | Karnataka<br>Rural | Urban | Bombay<br>Slums | All States |
|------------------------------------|------------------------|------------------|------|--------|--------------------|-------|-----------------|------------|
| A. Morbidity Status                |                        |                  |      |        |                    |       |                 |            |
| Fevers (Malaria)                   | 5                      | 24               | 21   | 34     | 21                 | 18    | 11              | 14         |
| Coughs (pneumonia)                 | 5                      | 15               | 26   | 15     | 33                 | 14    | 17              | 13         |
| Digestive disorder (dysentery)     | 10                     | 19               | 24   | 35     | 14                 | 13    | 22              | 14         |
| Nervous disorder (meningitis)      | 1                      | 2                | 2    | 2      | 1                  | 2     | 2               | 1          |
| Circulatory disorder (anaemia)     | 2                      | 3                | 3    | 4      | 2                  | 2     | 1               | 1          |
| General disorder (measle, tetanus) | 4                      | 17               | 11   | 6      | 5                  | 6     | 13              | 6          |
| B. Malnutrition status             |                        |                  |      |        |                    |       |                 |            |
| Pale skin/mucus membrane           | 2                      | 8                | 3    | 5      | 2                  | 2     | 8               | 4          |
| absence of muscles under skin      | 1                      | 4                | 3    | 6      | 2                  | 1     | 2               | 3          |
| Beeding of ribs                    | 1                      | 4                | 4    | 1      | 2                  | 1     | 1               | 3          |
| Swelling on face and feet          | 4                      | 3                | 1    | 5      | 3                  | 1     | 1               | 2          |
| discolouration or loss of hair     | 8                      | 4                | 2    | 4      | 2                  | 1     | 1               | 3          |
| frequent colds and infections      | 8                      | 13               | 10   | 27     | 29                 | 18    | 18              | 16         |
| C. Poor Health Status              |                        |                  |      |        |                    |       |                 |            |
| poor health in general during :    |                        |                  |      |        |                    |       |                 |            |
| - 0-6 months                       | 8                      | 15               | 17   | 15     | 15                 | 5     | 9               | 13         |
| - 7-12 months                      | 2                      | 5                | 6    | 3      | 6                  | 3     | 5               | 5          |
| Loss of weight during :            |                        |                  |      |        |                    |       |                 |            |
| - 0-6 months                       | 21                     | 37               | 23   | 19     | 29                 | 23    | 50              | 29         |
| - 7-12 months                      | 75                     | 72               | 78   | 74     | 64                 | 77    | 82              | 75         |
| D. Delayed Growth Status           |                        |                  |      |        |                    |       |                 |            |
| -steadyng neck after 2-3 months    | 38                     | 55               | 41   | 38     | 41                 | 60    | 58              | 48         |
| -rolling " 4-6 "                   | 65                     | 68               | 59   | 53     | 47                 | 58    | 60              | 59         |
| -sitting " 6-7 "                   | 77                     | 80               | 76   | 71     | 64                 | 62    | 72              | 73         |
| -crawling " 8-9 "                  | 86                     | 87               | 87   | 82     | 78                 | 76    | 81              | 83         |
| -standing " 10-11 "                | 92                     | 94               | 96   | 94     | 93                 | 92    | 94              | 94         |
| -walking " 12-13 "                 | 96                     | 97               | 98   | 98     | 96                 | 99    | 97              | 97         |





## CHAPTER 5 : CONCLUSIONS AND SUGGESTIONS

### 5.1 Purpose and Scope

This is a gist of the project on infant mortality in relation to fertility. This was sponsored jointly by the Family Planning Foundation and the International Development Research Centre, approved by the Central and State Governments and implemented by five institutes in 5 states i.e. Uttar Pradesh, Madhya Pradesh, Orissa, Bangalore and Bombay slums during 1987-88.

The main purpose of this project was to identify risk factors responsible for infant mortality, examine its relationship with fertility and suggest interventions to bring down both infant mortality and fertility in different population groups such as hilly, tribal, rural, urban and slum areas.

It was prompted by the concern for distressingly high levels and unpardonably slow trends of infant mortality, and guided by the conviction that infant mortality and fertility rates must fall rapidly and simultaneously by removing inequities in the distribution of resources and services with the help of strong political will without any delay.

### 5.2 Unique features

This is a unique project and first of its own kind in many ways. Firstly it is a diagnostic investigation to be followed by the experimentation with interventions. It has far reaching practical and policy implications. Secondly, its purpose is not to make estimations and generalization and develop theories and models but to have indepth understanding of the complex networks of risk factors and develop practical and pragmatic program of interventions to control them. Thirdly, it follows risk approach which integrates both medical and social science approaches to this twin problem and seeks to offer solutions which will work and produce results. Fourthly, it takes not only the span of child's life of 9 months before and 12 months after the birth but goes even beyond to find out what risk factors operate when, where and how in order to know what interventions will work when, where and how to prevent, reduce and eliminate risk factors. Fifthly, it takes into account the



whole range of risk factors, looks at them in totality and determines their relative and attributable risks to the life of infants with a view to control them. It deals with only those risk factors which can, should and must be controlled at once and at any cost. Lastly, it firmly believes that the scientific knowledge must be used by the people who provided data for changing the conditions and circumstances under which infant dies and may continue to die without timely interventions

### 5.3 Coverage and sampling

For the purpose of this project thus described 3 hilly and 5 rural districts of Uttar Pradesh, 10 rural and tribal districts of Madhya Pradesh, 5 tribal districts of Orissa, 5 districts (with interlocked sample of rural and urban areas) of Karnataka and 10 slums of Bombay were selected purposively on the basis of predominance of that characteristics. In each district two blocks were selected purposively i.e. one with and one without the intervention programme like integrated child development services (ICDS) or Universal Immunization Programme (UIP). In each block 10 clusters of 150 households were selected randomly while ensuring geographical representation at each stage of the sampling. At the last stage schedule-3 for the household was canvassed to enumerate and list all usual resident members of households in terms of basic demographic parameters. Having identified mothers who have had live births in the last two years, schedule-4 for mothers was canvassed to every mother whose child did not survive and every alternative one whose child survived, with a view to probe into all risk factors which were operating at pre-conception, pre-natal, peri-natal, neo-natal, post-neo-natal, and post infancy stages.

In addition to this data regarding essential health, educational and infrastructural facilities available and accessible at the community level were collected through schedule-1 and data about education, training service, experience, job satisfaction and correctness of knowledge about risk factors and situation were collected from Dais, ANM and other grass-root health workers providing health and family welfare services, through schedule-2.





5.4

5.4 Analysis of Profile

Based on these data, analysis of profiles of communities, health workers and population groups was done and presented in Chapter-3 which broughtout the following conclusions:

- i in order to tackle the twin problem of high infant mortality and fertility basic facilities like trained Dais, Health Guides, Anganwadi, Primary School, non-formal education centre, women's organisation, motorable road and electricity, which are still absent, inadequate, defunct or mismanaged in many communities are absolutely essential. The higher level facilities such as ANMs and sub-centres should be available within 5 kilometers and the rest still higher level services like primary health centre, private/government doctor and hospital, drug stores etc. should be available within 10 kilometers from communities. Facilities within communities are far more effective than those within 5 or 10 kilometers.
- ii. Health, educational and infrastructural facilities within communities are necessary but not sufficient to take care of the problem. They must be complemented and supplemented, linked and integrated in a nested hierarchy with higher-order services for efficient and equitable distribution of health and family welfare services and bring down infant mortality and fertility.
- iii. The facilities mentioned above without essential training in crucial tasks related to child survival which Dais, ANM and other health workers are supposed to perform has no meaning. This training which was most essential for Dais found to be inadequate and unsatisfactory to a great extent and for ANMs to some extent. Even the correctness of their knowledge about major risk factors and interventions to control them was far from satisfactory even among ANMs particularly with regard to supplementary feeding and oral rehydration therapy.
- iv. The percentage of currently married women who got married before the legal age of 18 was as high as 90 in M.P., 87 in hilly U.P. and that of those who even conceived before



that legal age was 59 in M.P. and 48 in rural Karnataka.

The general fertility rate varied from 91 in Bombay slums to 230 in rural U.P. and infant mortality rate ranged from 64 in urban Karnataka to 214 in rural U.P. The infant mortality rate was generally higher among males than females in all states except in hilly U.P. and its neo-natal rate was around 60% of the total infant mortality rate in most of the population groups.

#### 5.4 Analysis of Risk Factors

From the state-wise analysis and inter-state comparisons of risk factors in terms of prevalence and incidence rates as well as relative and attributable risks, interesting and meaningful patterns and configurations of risk factors operating at various levels emerged rather consistently and distinctly which are presented and summarised here rather briefly.

##### 5.4.1 Pre-conception and post-infancy stage

At the pre-conception stage where risk factors related to previous maternal, fertility and pregnancy history interact and combine with one another to produce outcome of infant mortality later on. It brings out a simple fact very clearly that the history of previous pregnancy complication, pregnancy losses and infant death has a tendency to repeat itself unless it is effectively intervened. Similarly if a woman bears children too early (before 18) or too later (after 35), too close (within two years) or too many (more than two) she carried with her the risk for her next child too. There also appears the vicious circle of having too early, too often and too many children which leads to more pregnancy complications, losses and infant deaths, which in turn leads to the temptation or foolishness to have again too many, too late adding further risk for the life of the next child cumulatively. This is further confirmed and substantiated by the analysis of risk factor operating at post-infancy stage later on. About 5 - 10% women became pregnant within one year from the birth of index child and in all states the infant mortality rate



—

—

—

—

—

—

—

—

—

—

was 200% higher than the rest. It was over 500% in Karnataka. This confirmed the replacement or insurance hypothesis of child survival in concrete behaviour terms. Even in intentional terms desire to have more children to ensure the survival of the required number and to replace one or have more in place of earlier death was 132% stronger than the rest. Perhaps behaviour is a better proof of child survival hypothesis than the intention or desire which was found to be just the opposite in hilly U.P., rural Karnataka and Bombay slums.

Family Planning is the best intervention to break this vicious circle. Identification of high parity women with traumatic history of previous pregnancy complications, on losses and infant deaths, who also happen to be above 35 years in all probability and provision of contraceptive advice and services both by health and family planning workers is the most important and urgent task. Prevention is better than cure. This must be done before they become pregnant and run the risk.

No doubt it is difficult task particularly in hilly U.P., Orissa and Karnataka where women did not prefer any family planning methods, inspite of higher relative risk of infant deaths. In U.P., urban Karnataka and Bombay slums infant mortality rate was substantially higher in case of those women who did not use contraceptives before. This proves the point made here that if contraceptives are not used as an intervention in this case, infant mortality cannot be reduced.

#### 5.4.2 Pre-natal Stage

At the pre-natal stage, mother's ill-health is mainly due to palour, malaria, german measles, convulsions, oedema and anaemia resulting into loss of weight; inadequate dietary intake particularly that of eggs, meat, fish and milk; lack of medical care at sickness and lack of pre-natal care in the form of tetanus toxoid, iron tablets and folic acid emerged as the most important risk factors in all population groups. Smoking also emerged as an important factor with more than 160% relative risk in all states. In Orissa where 70%



women smoke, it was the most hazardous. Invariably these risks are closely associated with women below poverty as shown later on. It is therefore suggested to identify women below poverty line on the basis of severity and chronicity of diseases and inadequacy of dietary intake register them at clinic; provide supplementary food and health and nutrition education through women's organisations; infection treatment tetanus toxoid, iron tablets and folic acid and regular check-up while keeping watch on their health and weight.

At the peri-natal stage, the following factors were considered and analyzed as risk factors i.e. pre-term, prolonged labour, antepartum haemorrhage, breech presentation, surgical delivery, home delivery, traditional birth attendance, low-birth-weight of less than 2.5 kg, and other complications experienced by the child at birth such as birth injury and cord infection, cyanosis and icterus, convulsions respiratory distress, malformation, abdominal distension and poor feeding etc., the lack of medical treatment during these problems and denial of colostrum and breast-feeding from the first day.

Analysis of these risk factors has shown that birth related complications for mothers (mainly antepartum haemorrhage which was prevalent in more than 30% cases) and also for the new born (mainly immaturity and low birth-weight, cord infection and birth injury respiratory distress, cyanosis and icterus and poor breast feeding) are more common and serious than even the best doctors can imagine. In the absence of proper medical attention, care and supervision these problems which need prompt interventions become worse adding risk manifold. Except in urban areas of Karnataka and slums of Bombay, about 70 to 90% deliveries are attended by the traditional birth attendant called Dai who is often untrained and ill-equipped in safe and modern methods. Keeping this syndrome in view the following interventions are perhaps most appropriate and effective ones i.e.

- i. training of Dais, provision of safe delivery kit depending on the case load, common medicines, and knowledge of risk factors for early detection and timely referral
- ii. Screening of high risk mothers and babies and provision of intensive, hospital-based (if necessary) peri-natal and natal care through systematic and regular visits of ANMs and doctors.





### 5.4.3 Post-natal Stage

At the post-natal stage, another set of risk factors were analysed carefully i.e. inadequate breast-feeding and supplementary feeding, lack of immunization for BCG, Polio and DPT, poor health status, infections, malnutrition and growth faltering.

During the first six months of infants breast feeding and self-care including oral rehydration therapy, immunisation and growth monitoring are obviously the most powerful interventions already recognized by the developing world. The problematic aspect is not the short duration but denial of colostrum or first milk from the first day at birth, stoppage of breast milk during the attacks of sickness like diarrhoea and poor personal hygiene. Education is needed on this aspect for all mothers along with supplementary feeding.

Among the diseases which affect infants the following are more prevalent, serious and fatal in the order of importance i.e. causes peculiar to infancy (mentioned earlier), other clear symptoms (mainly tetanus, jaundice, measles), digestive disorders (mainly gastro-enteritis and dysentery), coughs (mainly pneumonia and bronchitis), fevers (mainly malaria) and circulatory (mainly anaemia).

The symptoms of malnutrition appear during the second half of infant's life in about 4 to 8 per cent cases with the relative risk of over 400 per cent.

Perhaps the most appropriate intervention that is taken for granted but often ignored seriously is mother craft or self-care. This involves close interaction between mothers and dais, ANMs and Health Educators and continuous process of dialogue and education. Not many mothers know the best methods of bathing, cleaning, fondling and rocking babies, pre-lacteal, breast and supplementary feeding and weaning practices, risk factors and interventions to control themselves, environmental and personal hygiene; best traditional, indigenous, herbal, folk and home remedies and tonics. This kind of education alone can make them perfect in mother craft, self-care and increase their demand for use of primary health care services at various stages mentioned earlier.

Generally, the degree of exposure to different mass-media for health information was found to be extremely low except in Karnataka cities and Bombay slums as population groups and radio as a popular medium. Radio and



posters can be most effectively used for this purpose because of their reach and penetration on the one hand and neither cash nor literacy is needed to learn from them on the other.

Personal contacts with health workers like Dai, ANM, private and government doctor for pre-natal and post-natal care are far and few. As compared to pre-natal stage, contacts and visits for check-up, referral and follow-up are more erratic and scarce during post-natal care. People have a tendency to go to ANM or Doctor only as a last resort particularly when the problem becomes serious and goes beyond control. This perhaps is the reason why infant mortality rate is found to be higher among those in touch with ANMs and doctors than among those who are not.

#### 5.4.4. Perenial Stage

At the perenial stage, which involves all stages, environmental factors are at work. They include use of water from pond/river or well, use of unfiltered water, open drainage and garbage disposal near the house, open/pit latrine through which infections and diseases spread; kutcha house, poor ventilation, severe smoke and lack of electricity which make life of mother and child uncomfortable, miserable and vulnerable in many ways; lack or insufficiency of warm clothes, mosquito nets and common medicines which can protect or cure the infant from cold and malaria; and working class background, poverty and illiteracy of parents and lack of participation in women's organisation, which restrict the opportunities and deny access to resources and services.

Analysis of these perenial risk factors which operate at all levels, all the time brought out number of interesting findings.

Firstly, these factors are nothing but different facets of poverty defined as lack of necessities of life. Correlational analysis has brought out extremely clearly that poverty implies two dimensions i.e. lack of access to resources or necessities of life such as housing, clothes, sanitation, drinking water, education and health information through mass media. Except in Orissa and Hilly Uttar Pradesh, all these factors are highly and significantly related to monthly household income of less than Rs 500 as a crude proxy of poverty. It is also found to be significantly related to another set of factors implying access to medical care or health services for mother and child at birth, complication or sickness.





It is because of these significant correlations, poverty operates at all stages all the time, in all forms and takes the heaviest toll of infant life in a far more devastating manner than the war, famine or disease. This probably was the reason why Blake has said, " sooner murder an infant in its cradle than nurse unacted desires." That probably was the reason why Wesley asked, " And must I, Lord, bring forth a child for Satan to devour." Poverty triggers off, through malnutrition, disease and ignorance precipitates the chain of morbid events to infant deaths.

It is for this reason alone it is suggested to introduce a comprehensive scheme of Family income supplement, particularly for low-wage earning workers below poverty line, which may include supply of free milk and vitamins to mothers atleast for one year, i.e. 6 months before and 6 months after the child birth; hospital fare to enable mothers to visit PHC or hospital on referral; items like mosquito nets in malaria zones, little blankets for babies in colder zones and common medicines for infants' mothers in zones where there are no doctors. It was found that the risk to infant life is almost 150 per cent in summer in rural U.P., M.P., and rural Karnataka and almost same in winter in rural U.P. and Orissa due to lack of insufficiency of blanket, mosquito net and common medicines.

Except in urban Karnataka and Bombay slums where tap or pump is available, the percentage of mothers using unsafe and contaminated water from pond, river or well was around 90 per cent in Orissa, between 60 to 70 per cent in U.P. and M.P. and 44 per cent in rural Karnataka. The percentage of those who use this water without filtration is above 90 per cent in all these areas, and between 50 to 75 in urban Karnataka and Bombay slums. If safe drinking water source cannot be made available to rural people even after 40 years of independence, then the simplest invention would be to make people boil and filter water before it is used for the baby atleast for the first six months of her life. Safe water to save the child!

Among sanitation items open/pit lat is the most hazardous but used by over 90 per cent in all rural population groups.

Except in M.P. and rural Karnataka, severe smoke in the kitchen and poor ventilation in the house has increased the risk to infant life by 150 per cent. In the name of appropriate technology, is it not possible to provide smokeless chullahs on a subsidy basis and "Sulabh Sauchalaya" on a community or even commercial basis to save the life of infants. If government cannot afford to



provide these basic, bare minimum needs then why can't people organise themselves.

The analysis of socio-economic risk factors like working class background, poverty and illiteracy of parents and lack of participation in women's organisations reveals that lack of participation in women's organisations means 160 per cent more infant deaths. Among occupational categories wage labourers are in the most disadvantageous position running more than 220 per cent risk to their infants. The children of migrant labourers die soon and die more because they are deprived of attention and care, exposed to hazards and risks informally associated with their jobs besides poverty. Creches might be the solution to this problem.

So far relative importance and contribution of risk factors was judged on the basis of prevalence and incidence rates and relative and attributable risks associated with different factors operating at different stages.

#### 5.4.5 Risk-factors as Determinants

Multiple regression was also used to identify risk factors as determinants of infant mortality after controlling the effects of other variables on each other. The determinants are chosen on the basis of beta coefficients and arranged in descending order state by state as follows :

##### 1. Hilly areas of Uttar Pradesh

- 1.1 Strenuous work for more than 3 hours;
- 1.2 Faultered growth of child;
- 1.3 Inadequate supplementary feeding;
- 1.4 Previous pregnancy losses;
- 1.5 Lack of immunization of child;
- 1.6 Symptoms of malnutrition;
- 1.7 Poor health of mother;
- 1.8 Poor health of child;
- 1.9 Poor housing;

(50 per cent infant deaths are due to these risk factors)

##### 2. Rural areas of Uttar Pradesh

- 2.1 Poor health of child;
- 2.2 Faultered growth of child;
- 2.3 Inadequate supplementary feeding;
- 2.4 Lack of immunisation of child;
- 2.5 Symptoms of malnutrition;



party  
film.

M

- 2.6 Inadequate breastfeeding;
  - 2.7 Grand multi-parity;
  - 2.8 Low Birth Weight baby;
  - 2.9 Intercurrent illnesses;
  - 2.10 Labour complications;
  - 2.11 Lack of tetanus toxoids and iron tablets;
  - 2.12 No previous use of contraceptives;
  - 2.13 Poor sanitation;
- ( 48 per cent infant deaths are due to these risk factors)

3. Madhya Pradesh

- 3.1 Inadequate supplementary feeding;
  - 3.2 Poor health of child;
  - 3.3 Faltered growth of child;
  - 3.4 Inadequate dietary intake of mother;
  - 3.5 Lack of immunisation of child;
  - 3.6 No previous use of contraceptives;
- (62 per cent infant deaths are due to these risk factors)

4. Orissa

- 4.1 Inadequate supplementary feeding;
  - 4.2 Lack of immunisation of child;
  - 4.3 Lack of participation in women's associations;
  - 4.4 Unsafe drinking water;
  - 4.5 Low income;
  - 4.6 Cholastrum not given;
  - 4.7 Low birth weight baby;
  - 4.8 Poor health of child;
  - 4.9 Traditional birth attendant;
  - 4.10 Labour complications;
  - 4.11 Inadequate dietary intake of mother;
  - 4.12 Poor health of mother;
- (62 per cent infant deaths due to these risk factors)



5 Rural Areas of Karnataka

- 5.1 Poor health of child;
- 5.2 Inadequate breast-feeding;
- 5.3 Illness of child;
- 5.4 Lack of immunisation of child;
- 5.5 Grand multi-parity;
- 5.6 Cholastrum not given;
- 5.7 No participation in women's organisations;
- 5.8 Traditional Birth Attendant;
- 5.9 Strenuous work for more than 3 hours a day;
- 5.10 Labour complications
- 5.11 Non-use of mass media for health information;
- 5.12 Delivery complications
- 5.13 Child-birth complications;
- 5.14 Preceding birth interval of less than 2 years;
- 5.15 No previous use of contraceptives; //
- 5.16 Poor sanitation;

(48 per cent infant deaths are due to these risk factors)

6. Urban areas of Karnataka

- 6.1 Illness of child;
- 6.2 Birth complications;
- 6.3 Inadequate winter clothes;
- 6.4 Symptoms of malnutrition;
- 6.5 **Stronuous** work for more than 3 hours a day;
- 6.6 Traditional Birth Attendant;
- 6.7 Immaturity;
- 6.8 Contraceptives not used before ; //
- 6.9 Preceding birth interval of less than 2 years;

(48 per cent infant deaths are due to these risk factors)

7. Slum areas of Bombay

- 7.1 Inadequate breast feeding;
  - 7.2 Lack of immunisation of child;
  - 7.3 Inadequate supplementary feeding;
  - 7.4 Lack of participation in women's organisations;
- (42 per cent infant deaths are due to these risk factors)





This state-wise list of risk-factors as significant determinants of infant mortality bring out that :

- (i) priorities are different from one area to another and
- (ii) over 50 per cent infant deaths are due to the risk factors listed.

The draw-backs of multiple regression is that it does not bring out interactive, multiplicative or synergistic effects of risk factors on infant mortality and distant and indirect risk factors which are often crucial turn out to be insignificant.

A simple analysis of risk factors using relative and attributable risks of factors operating at various stages logically conceived is far more superior to multiple regression analysis. It gives all details that are required to plan, implement, monitor and evaluate interventions in specific terms.

#### 5.4.6 Towards Interventions

A good intervention strategy be worked out for any area on the basis of knowledge of these risk factors verified on the ground by the communities and health workers jointly. Using the principles of entitlement of the child and empowerment of mothers and health workers, interventions can be planned, experimented with, monitored and evaluated for their efficacy and effectiveness, practicality and feasibility in any given area of primary health centre with the full cooperation and participation of communities and health workers and peripheral inputs and support from the organisation like FPF and IDRC not only to give back the knowledge of risk factors obtained from them to themselves but also to equip them with necessary capabilities. Skills and means to control them in accordance with local conditions and priorities.

Intervention strategy based on the analysis of risk factors will require, in addition, a careful appraisal of the working of the health services, plans for their improvement and some estimates of the possibilities of change. This will involve a description of community resources, including health and other social agencies and health and health related personnel, a simple management information system to know the population at risk, the services provided, their utilisation, and the results achieved. This system can be used to extend coverage, to change practices and to modify the referral chain on the basis of the best match of need with facility. Such reorganisation with continuous monitoring and feedback,



has clear implications for training and supervision and for the organisation of the health services generally.

Implementation of interventions based on the analysis of risk factors should be directed at mothers and children and grass-root health and family planning workers and should have effects on the whole health and social systems. Success will, however, depend first and foremost on an ability and willingness to reallocate resources and on a health care system that is capable of change and eager for improvement. Professional conservatism and political resistance are but two of the many potential-barriers to implementation. Without the requisite political commitment to the noble goal of health for all, the redressal of inequities is not possible and without which infant mortality rates and subsequently fertility rates will not fall on their own without timely and effective interventions.

"Time has come to establish the principle that children belong to the Republic before they belong to their parents."

- Danton

"State must distinguish between the right to live and right to give life."

- Gunther





SELECT BIBLIOGRAPHY

Infant Mortality in Relation  
to  
Fertility

1. Agarwal, V K et al (1982). Some observations on perinatal mortality. Indian Paediatrics, 19(3)
2. Agrawal R D and Jaiswal S S. Recent Trends in Infant Mortality in India, Sample Registration Bulletin, Vol.VI, July-December 1972, pp 27-34.
3. Agrawal R D. Influence of Infant and Child Mortality on Fertility in India, Seminar on Infant Mortality in Relation to the level of Fertility 6-12, May 1975, Bangkok (Thailand), Circled, 1975, pp. 163-183.
4. Araki M (1983). A 20th century miracle in a 19th century village infant mortality ... zero! Joicfp Review (5):6-12.
5. Armstrong, Anne, 'Infant Mortality - Some possible Determinants', Canadian Journal of Public Health, June 1966.
6. Arora Y L. 'Infant Mortality and Family Planning', Journal of Family Welfare, Vol 26, No.4, June 1980, pp. 73-78.
7. Ashby H P, 'Infant Mortality (London : Cambridge University Press, 1926)
8. Bai B Muktha, 'Infant Mortality in India', Indian Medical Gazette, June 1939.
9. Bajpai P C, Kutty D, Rajagopalan K C and Wahal K M, 'Observations on Perinatal Mortality', Indian Paediatrics, March 1966.
10. Barbara D M (1981). The endangered sex: neglect of female children in rural North India. Ithaca : Cornell University Press.
11. Behm H (1980). Socio Economic determinants of mortality. Latin America Population Bulletin, (13):1-15.
12. Benjamin B, Social and Economic Factors Affecting Mortality (The Hague : Mouton & Co., 1966).



13. Bhargava S K, S K Mittal (1982). The challenge of infant mortality - need for a national commitment. Indian Practitioner, Editorial 19 April (4) : 287 - 289.
14. Bhargava S K, 'Identification of High Risk Infants and Mothers : Preliminary Results of a National Collaboration Study. Presented at the Seminar on the determinants of infant mortality in India. Gujarat Institute of Area Planning and Population Control (New York) Ahmedabad, 1984.
15. Bhargava S K, Srinivasa S, Kishan J, 'A simplified scoring system for identification of high risk Births'. Indian Practitioner 1982, 19 : 209 - 215.
16. Bhargava V, Ghosh S, and Bhargava S K, 'Survival Rate, Growth and Development Pattern of Low-Birth-Weight Babies in First Year of Life', Indian Paediatrics, 6:226, April 1969.
17. Bhinder P K, 'Impressions on Infant Feeding in Different Parts of India', Alumni Association Bulletin, Calcutta : All-India Institute of Hygiene and Public Health, April 1960.
18. Bhattacharya B N et al (1980). Some sex differentials of infant mortality in rural areas. The Journal of Family Welfare, 27 (2)
19. Brend, William A, 'The relative importance of pre-natal and post-natal conditions as causes of infant mortality (London:H M S O, 1918).
20. Butler N R, 'Causes and prevention of perinatal mortality', W H O Chronicle, February 1967.
21. Cassen R H (1978). India : population economy, society. New York : Holmes and Meier Publishers Inc.
22. Chakraborty P N, 'Study of differential infant mortality among the residents of bustees and non-bustees in Chetla area', Alumni Association Bulletin, Calcutta : All India Institute of Hygiene and Public Health, April 1963.
23. Chandra R K and P M Neberne (1977). Nutrition, Immunity and Infection New York Plenum Press.
24. Chandrasekhar S (1972). Infant Mortality, population growth and family planning in India, London : George Allen and Unwin Limited.





25. Chandrasekhar S, 'Infant Mortality in India 1901-51', Proceedings of the World Population Conference, Rome, 1954, Vol I, New York United Nations 1955.
26. Chandrasekhar S, 'Infant Mortality in India 1901-1955 (London : Allen & Unwin, 1959).
27. Chen C Lincoln (1983). Child survival : levels, trends and determinants. In Determinants of fertility in developing countries : a summary of knowledge. Part A, Committee on Population and Demography. National Academy Press. Pp. 163-90
28. Chen C Lincoln (1981). Child survival : levels, trends and determinants. In Determinants of fertility in developing countries : a summary of knowledge. NAS.
29. Chen L C, S Ahmed, M C Gesche, and W H Mosley (1974). A prospective study of birth interval dynamics in rural Bangladesh. Population Studies 28:277.
30. Ciered and WHO (1983). Infant and child mortality in the third world. Inter-Centre Cooperative Research Programme. Project No.1 : Final Report.
31. Daly C, et al., 'Social and Biological Factors in Infant Mortality III. The Effect of Mother's Age and Parity on Social Class D Differences in Infant Mortality', The Lancet, February 26, 1955.
32. Dayal R S, Prasad R, and Mathur G P, 'Morbidity and Mortality Data', Indian Journal of Child Health, December 1962.
33. Dange A S, 'Estimation of Under-registration of Infant Deaths, Sample Registration Bulletin, Vol.X, No.2, April 1976, pp.18-25.
34. Dasvarma G L and Balasubramanian K, 'Child Mortality Social Status and Fertility in India : A Note on Singh's Paper', Social Biology, Vol. 23, No.1, 1976, pp. 90-91.
35. Das K K, Rahaman A, Sen A K and Mukherjee. 'Infant Mortality in an Urban Locality of Calcutta', Indian Journal of Public Health, Vol 23, 3, Sept. 1979, pp 139-146.
36. Das, Narayan and Dey A S. 'Mortality Decline in India : Influence of Development vs. Public Health Programme, in Population Policy Perspectives in Developing Countries, edited by Vatsala Narain and C P Prakasam, Himalaya Publishing House, Bombay 1983, pp325-341.



37. Datta N, Kumar V, Kumar L. 'Infant Mortality Related to Birth Weight in a rural community! A cohort study. (Under Publication)
38. Dyson, Tim and Mick Moore, 1983. 'On Kinship structure female autonomy and demographic behaviour in India'. *Population and Development Review*. 9(1), 35-39.
39. Edmonstron, Barry and Radheshyam Bairagi. (1982). Infant and Child mortality in Bangladesh. Bangladesh : Institute of Statistics Research and Training. University of Dacca. Pp. 1-223.
40. El-Kammash, Majdi M, 'Stockwell's Infant Mortality Index for Measuring Economic Development - A Comment', *Milbank Memorial Fund Quarterly*, January 1962.
41. Feldstein M S, et al, 'Analysis of Factors Affecting Perinatal Mortality; A Multivariate Statistical Approach', *British Journal of Preventive and Social Medicine* 19:128-34, 1965.
42. Fernando F S, Dallas(1981). Factors influencing the infant mortality rate in Sri Lanka. *Journal of Biosocial Sciences*, 13, 281-86.
43. Gandotra M M, Narayan Das, Dy D. 'Effect of Child Mortality on Fertility : Some Evidence from Indian Studies - Proceedings of the ICMR/Ford Foundation Workshop on Child Health, Nutrition and Family Planning held at Jammu during Dec. 1983, P.98-111.
44. Gandotra M M, Das Narayan and Dey, Devamony. 'Influence of Infant and Child Mortality on Fertility in India'. A Brief Report on Ford and Rockefeller Foundation's Research Project, Population Research Centre, Baroda, February 1981.
45. Gardner, Lytt I (1972). Deprivation dwarfism. *Scientific American*, 227(1):76-82.
46. George F, Brown, Jaun Laing and Jasen (1982). India's population policies and programs. Bangkok : The Population Council Regional Office.
47. Ghosh S. 'Discrimination begins at birth. *Indian Paediatrician* 1986; 23:9-15.





48. Ghosh S, 'Study of Childhood Mortality', Indian Journal of Child Health, May 1961.
49. Gopal Y S and Chandra Mouli A S, 'Infant Mortality and Fertility Limitation : An Empirical Investigation, 'Health and Population Perspectives and Issues, Vol.4, No.4, Oct-Dec 1981, pp266-277.
50. Gordon J R, Gideon H, Wyon J B. 'Child Birth in Rural Punjab - India. Am J Med Sci. 1964; 126: 344-461.
51. Government of India. 1982. Report of the Task force on minimum perinatal care. Pp.1-49.
52. Gunasekaran S. 'Determinants of infant mortality in rural areas of Tamil Nadu. Presented at the seminar on 'The determinants of infant mortality in India', Ahmedabad 1984.
53. Gupta S D, T P Jain, S Joshi, D K Mangal (1981). Infant mortality in Rajasthan villages, Indian Paediatrics, 18(2):101-5.
54. Gupta S R. 'Mortality Pattern in India in Demographic trends in India, edited by R B Chari, O P Sharma and R K Bhatia, Sunlight Printers Delhi, 1975, pp. 44-45.
55. Gupta S. 'Infant Mortality'. Indian Paediatrics 1976; 13: 403-404.
56. Gwatkin D R and Sarah K Brandel (1980). 'Infant and child mortality in the developing world, 1980-2000. Washington D C, Overseas Development Council.
57. Habicht J P, A Lechtig C, Yarbrough, and R E Klen (1976). Maternal nutrition birth weight and infant mortality. In K E Elliot and Knight (eds). Size at birth. Associated Scientific Publishers.
58. Haldar, A K, and N Bhattacharya (1969). Fertility and sex sequence of children of Indian couples. Sankhya. Series B, 31:144.
59. Immerwahr G E, 'Survivorship of Sons Under Conditions of Improving Mortality', Demography, Vol.4, No.2, 1967, pp 710-720.
60. Indian Research Fund Association Maternity and Child Welfare Advisory Committee, Memorandum on the Conduct of an Enquiry into Infant Mortality (New Delhi:1949).



61. 'Infant and Child Mortality in Selected Countries, 1951-62', Epidemiological and Vital Statistics Report (Geneva:W H O, Vol 17, No. 11, 1964)
62. 'Infant Mortality - An Appraisal of World Situation for the Decade 1949-58' Indian Medical Journal, August 1963.
63. Islam, M S Et al (1982). 'Infant mortality in rural Bangladesh an analysis of causes during neonatal and postneonatal periods. Journal of Tropical Paediatrics. Dec:28(6) 294-98.
64. Jain U C, 'Some Social components of infant mortality in India. Indian J Pediatr. 1968; 35:109-112.
65. Jain V C, 'Some Social Components of Infant Mortality in India' Indian Journal of Paediatrics, February 1969.
66. Jayant K, 'Birth Weight and Some Other Factors in Relation to Infant Survival; A Study of an Indian Sample', Annals of Human Genetics, March 1964.
67. Kabir M H (1982). Determinants and consequences of infant mortality : a short review. ISRT : Dacca University.
68. Kabir M and A A Howlader (1980). Socio-economic determinants of mortality in Bangladesh. Rural Demography. 7(1-2) 1-13.
69. Kanitkar T, Murthy B N, 'Factors Associated with Infant Mortality in Orissa and Rajasthan.' Presented at the seminar on 'Determinants of infant mortality in India', Ahmedabad 1984.
70. Kaprro S K, Reddiah V P, Lobo J, 'Antenatal care and prenatal mortality'. Indian J Pediatr., 1985; 52: 159-162.
71. Karkal M (1980). 'Infant and child mortality in Maharashtra, India, IPPF. p.16.
72. Karkal M (1980). 'Child morbidity and mortality in Greater Bombay Bombay: IIPS (Mimeo).
73. Khan M E. 'Factors Affecting Spacing of Births', The Journal of Family Welfare, Vol 20, No.2, December 1973, pp 54-67.





74. Kielmann A A et al. (1978). The Narangwal experiment on interacts of nutrition and infections: II morbidity and mortality effects. Indian Journal of Medical Research, 68:21-41.
75. Kohli K L, (1977). Mortality in India. A statewise study. New Delhi: Sterling Publishers Pvt Ltd.
76. Krishnan P (1975). Mortality decline in India, 1951-61, Development Vs Public Health Programme, Hypothesis. Soc Sci & Medicine, Vol 9: 475-79.
77. Kulkarni G A, 'Relation between Infant mortality and fertility', Sample registration bulletin, Vol IX, No.1, January 1975 and Vol IX, No. 2 April 1975, pp. 11-16.
78. Kumar V, Datta N, Saini S S. 'Infant Mortality in a rural community development block in Haryana. Indian J Pediatr. 1982; 49:795-802.
79. Kumar V, Datta N. 'Reduction of Infant mortality in India. Indian Pediatr 1982, 49:777-780.
80. Kumar V, 'Infant mortality and fertility - What do we know about. Proceedings of ICMR/Ford Foundation Workshop on Child Health, Nutrition and Family Planning, December 1983. p. 83-97.
81. Kumar V, Datta N. 'Community based studies on infant mortality in Haryana : Methodological issues of reporting and causation. Presented at the seminar on 'The determinants of infant mortality in India', Ahmedabad 1984.
82. Kumar V, Datta N. 'Intervention strategies for reduction of infant mortality. Indian J Pediatr. 1985; 52: 127-132.
83. Kumar V, Datta N. 'Lay reporting and verbal autopsy in assessment of infant mortality. Indian J Pediatr (under publication)
84. Kurup R S. 'On the contribution of infant mortality in explaining the variation in birth rates among the states in India' in : Population policy in India edited by M M Gandotra and Narayan Das, Blackie and Son Publishers Pvt. Ltd. Bombay, 1984, pp 156-160.



85. Lal A. 'Infant Mortality : Some socio-economic and biological determinants', Indian Journal of Child Health.
86. Lal Brijesh B. 'Infant Mortality in Rural India, Sample registration bulletin, No.20, Office of the registrar General, India, August 1968, pp 8-11
87. Lokeshwar S M, Pai P M. 'Mortality in Children - an analysis of 1690 deaths. Indian Pediatr. 1980; 17: 145-149.
88. Mahadevan K (1979). Sociology of fertility : determinants of fertility differentials in South India. New Delhi Sterling Publishers.
89. Mahadevan K (1983). Rethinking on policy and interventions to control infant and childhood mortality in developing countries. Seminar on Social and Health Policy and Mortality Prospects. Paris : INED and IUSSP. (Mimeo)
90. Manchanda S S and Sachdev K K, 'Morbidity and Mortality in Children in Northern India', Indian Journal of Paediatrics, 0 October 1962.
91. May, David A and Hear, David M. 'Son Survivorship Motivation and Family Size in India : A Computer Simulation', Population Studies Vol 22, No. 2, 1968, pp 199-210.
92. Meerdink J, and Ramachandran K V, 'Infant Mortality according to Social status in Greater Bombay', Journal of the Indian Medical Association, May 1, 1962.
93. Mir N A. 'Regionalization of perinatal care and its effect on perinatal mortality. Indian J Pediatr. 1986; 52: 333-338.
94. Mitra Asok, 'India's Population : Aspects of Quality and Control, Vol I, Abhinav Publications, New Delhi, 1978, Chapter IV, pp. 114-132.
95. Mohan V, Singh H C, Singh S et al. 'A retrospective study of infant mortality. Indian Pediatr. 1975; 12: 693-701.
96. Mosley W Henry (1983). Will primary health care reduce infant and child mortality? A critique of some current strategies with special reference to Africa and Asia. INED and IUSSP Conference.





97. Mosley W H (1979). Health nutrition and mortality in Bangladesh In Sirageldin (Ed), Research in human capital development. Greenwich : Jai Press. Pp 77-94.
98. Mosley W Henry (1977). (ed). Nutrition and human reproduction. New York:Plenum Press.
99. Mudaliar A L, The Causes of Antenatal, natal and neonatal mortality of infants with specific reference to South India (Madras:University of Madras, 1928).
100. Mukerji S, 'Assessment of infant mortality, childhood mortality and family planning targets from fertility data', in : Population Policy in India - with special reference to infant mortality and fertility edited by M M Gandotra and Narayan Das, Blackie & Son Publishers Pvt. Ltd., Bombay 1984, pp. 191-202.
101. Mundo F D, 'Infant Mortality - A Challenge', Journal of the Indian Paediatric Society, January 1962.
102. Muthusubramanian A, 'Infant mortality and population growth', Indian Journal of social work, April 1962.
103. Nag, Moni et. al. (1981). 'An anthropological approach to the study of the economic value of children in Java and Nepal. Current anthropology vol. 19, no.2.
104. Nag, Moni (1983). 'Impact of social development and economic development on mortality. Comparative study of Kerala and West Bengal'. Economic and political weekly. Annual number XVIII (19,20,21):877-900
105. Nair N S and Nayar T C V, 'Pre-natal mortality in Calicut, Kerala', Journal of Obstetrics and Gynaecology of India, August 1965.
106. Padmanabha P(1983). Census of India (1981) : Series I Paper II
107. Panikkar P G K (1975). Fall in mortality rates in Kerala : an explanatory hypothesis. Economic and Political weekly November, 22:1811-18.
108. Patel M (1980). Effects of the health service and environmental factors on infant mortality:the case of Sri Lanka. Journal of Epidemiology and Community Health. 34(2):76-82.



109. Patwardhan V N and Kamel W W, 'Studies on Vitamin A Deficiency in Infants and Young Children in Jordan (W H O, 1967)).
110. Padmanabha P(1982). 'Mortality in India : A note on trends and implications'. Economic and Political Weekly (XVII) 32, 1285-1290.
111. Phadke M V, 'Causes of infant mortality and morbidity', Journal of Indian paediatric society, October 1962.
112. Pichat, Jean Bourgeois (1981) Measuring infant mortality:I, principles and methods, II. Causes of death. Population.
113. Poti S Janardan and Biswas S, 'Study of child health during the first year of life' Sankhya (B), November 1963.
114. Preston, Samuel H (1979). Causes and consequences of mortality decline in less developed countries during the twentieth century. In Richard Easterlin (eds), Population and Economic change in less developed countries, N E Eco. Research
115. Preston Samuel H (1975). The changing relation between mortality and fertility trends. Public health reports, 831:715-27.
116. Preston Samuel H (1975). 'Introduction in S H Preston (ed). The effects of infant and child mortality on fertility. New York: Academic Press.
117. Preston, Samuel H (1975). 'The changing relation between mortality and level of economic development. Population Studies, 29(2), 231-48.
118. Preston S H and V E Nelson (1974). 'Structure and change in causes of death: and international summary, Population Studies, 28(1): 19-51.
119. Puffer R R and C V Serrano (1975). Birth weight, maternal age and birth order:three infant determinants of infant mortality. Washington D C : Pan American Health Organisation Publication no. 294.
120. Raddian V P Nath L M. 'Infant mortality in rural areas of comprehensive rural health services project Ballabgarh. Indian Pediatr 1978: 15:547-551.
121. Rajaratnam Abel. 'Impact of Rhusa's health and development programmes on infant mortality. Presented at the seminar on



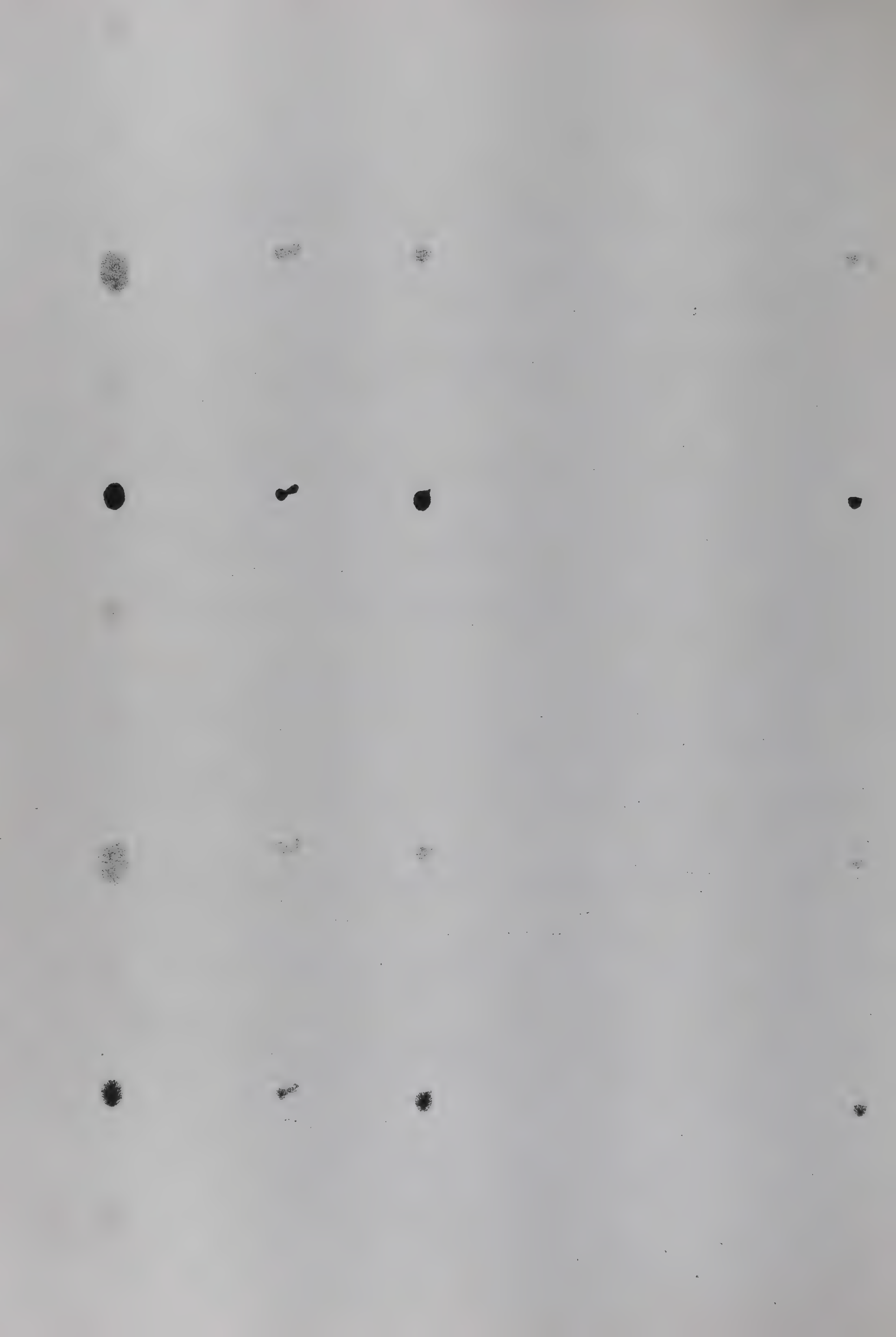


122. Ramachandran K V and Gupta S R. 'An evaluation of the sample registration scheme in India, Artha Vijnana, XIV, June 1972, pp 131.
123. Ramachandran L. 'Mortality and Rural health services'. The Gandhigram Inst. of rural health and family planning Madurai District, Tamil Nadu.
24. Ramanujam C. 'Correlates of sex differences in infant mortality in rural Tamil Nadu. Presented at the Seminar on 'The determinants of infant mortality in India, August 1984.
125. Rao P S S, Inbaraj S G. 'A prospective study of infant mortality and congenital intra-uterine growth rates in South India. Indian J Med Res 1978; 67:245-254.
126. Rao V N, Coyaji B J. 'A cohort study on infant survival Vadu rural health project.' Presented in the seminar on 'The determinants of infant mortality in India', Ahmedabad 1984.
127. Rastogi K K. 'Mortality Differentials in India, in : Demographic trends in India', edited by R B Chari, O P Sharma and K K Bhatia Sunlight Printers, Delhi, 1975 pp.32-35
128. Reddaiah V P, Nath L M. 'Infant mortality in rural areas of comprehensive rural health services project, Ballabgarh'. Indian p pediatrics, XV7, July 1978.
129. Reddy P H et al. 'Fertility, mortality and demand for family planning A longitudinal study in progress', Newsletter, Vol 1, No.4, Population Centre, Bangalore 1975.
130. Registrar General(1980). 'Survey on infant and child mortality: a preliminary report. New: Office of the Registrar General, India.
131. Registrar General of India. (1971). Causes of death: a survey report for 1971.
132. Registrar General of India. (1983). Survey of infant and child mortality, 1979. Ministry of Home Affairs, New Delhi.
133. Ross, John A (Ed) (1982). International Encyclopedia of Population Vols I & II. The Free Press: pp 342 and 1912-79.



134. Ruzicka L T and Tara Kanitkar (1972). 'Infant mortality in the urban setting : the case of Greater Bombay. In K E Vaidyanathan (ed), Studies on mortality in India. GJRP & FP monograph, p 200.
135. Saksena D N and J N Srivastava (1980). Bio-social correlates of perinatal mortality : experiences of an Indian hospital. Journal of bio-social sciences, 12(1):69-81.
136. Salimano, Georgio R and Vine Marty (1980). Malnutrition, infection and infant mortality. In S H Preston (ed), Biological & social aspects of mortality and the length of life. Liege:Ordina Editions pp. 83-111.
137. Satur D M & Bhatia S, 'A review of work done on infant mortality (New Delhi:Indian Council of Medical Research, 1957).
138. Sampath S, Jain P C and Prasad B G. 'A study of infant mortality in Lucknow cantonment.' Indian J Med Res. 1970; 58:772-781.
139. Saxena G B, 'Analysis of inequalities in infantile mortality; A sample survey of rural Uttar Pradesh', Medical Digest, March 1962.
140. Script P P. 'Inter-relationship between infant mortality and fertility : some evidence from Indian studies. Proceedings of the ICMR/Ford Foundation Workshop on Child Health, Nutrition and Family Planning held at Jammu during December 1983, p.112-123.
141. Sen Gupta N, 'Infant mortality and Hindu customs', Medical review of reviews, 5, 1930.
142. Shah F K & H Abbey (1971). 'Effects of some factors on neonatal and post-neonatal mortality. Milbank Memorial Fund quarterly, 49:33-57.
143. Shah P M, Udani P M 'Analysis of the vital statistics from the rural community palghar II. Perinatal neonatal and infant mortality. Indian Pediatr, 1969; 6:651-668.
144. Shah U, Pratinihi A K, Bhatlawande P V. 'Perinatal mortality in rural India: Intervention through Primary health care II Neonatal mortality. J Epidemiol and Community Health 1984; 38: 138-142.





145. Shah U. 'Perinatal mortality in India : Can it be reduced through primary health care. Indian J Pediatr. 1986; 53 : 327-334.
146. Sharma M L, 'Infant mortality in India and its causes and prevention', Indian medical journal 27, 1933.
147. Simmons, George B, Cheleste Smuckler, Stan Bern Stein and Eric Jensen (1982). Post-neonatal mortality in rural India : implications of an economic model. Demography. Vol 19 No.3:371-89.
148. Singh K P. 'Influence of infant and child mortality on fertility Paper presented in the Conference on 'Child in India', organised by IASP at India International Centre, New Delhi, 22-24, March 1979.
149. Singh K P. 'Child mortality, social status and fertility in India', social biology, Vol 21, No. 4, 1974, pp 385-388.
150. Singh, S N and Chakrabarty K C. 'Some findings on the influence of infant mortality on fertility in a rural environment in India', in : Seminar on infant mortality in relation to the level of fertility, circled, Bangkok (Thailand), 1975, pp.351-356.
151. Singh M. 'Hospital based data on perinatal and neonatal mortality in India. Indian Pediatr. 1986, 23:579-584.
152. Singhal P K, Mathur G P, Mathur S, Singh Y D. 'Mortality pattern in under six children in ICDS urban slum.' Indian Pediatr. 1986; 23: 617-622.
153. Sivamurthy M. 'Perspectives for mortality decline in India, in : Population policy perspectives in developing countries, edited by Vatsala Narain & C P Prakasam, Himalaya Publishing House, Bombay, 1983 pp. 265-278.
154. Srinivasan K. 'Some methodological issues and suggestions in the study of determinants of infant mortality. Presented at the seminar on the determinants of infant mortality in India. Gujarat Institute of Area planning and Population Council (New York), Ahmedabad.



155. Srivastava D K, Danabalan L, Anand D. 'Certain aspects of infant mortality - A prospective study in an urban community. Indian Pediatr. 1976, 13: 409-413.
156. Srivastava D K, Danabalan L, 'Gnanasujayan L et al. 'Influence of maternal care, parity and birth weight of neonatal mortality - A prospective study in an urban community. Indian J Med Res. 1976; 64: 358-364.
157. Srivastava J K, and Saxena D K. 'Infant mortality in an urban setting: study of socio-demographic and health care differentials', paper presented in the IASP Conference on 'Population Distribution and Development', held at ISI, Calcutta, 29-31 December 1980.
158. Srivastava V K and Pandey G D. 'Infant mortality and fertility - An empirical investigation', Journal of Family Welfare, Vol XIV, No. 3, March 1979, pp. 57-63.
159. Srivastava and D K Saxena (1981). Infant mortality differentials in an Indian context : follow-up of hospital deliveries. Journal of biosocial sciences, 13, 467-78.
160. Subhadra Devi V. 'Effect of perception of infant mortality on actual family size'. The Journal of family welfare, Vol. 24, No.4, June 1978, pp 26-33.
161. Sugathan, T N and Kashyap, Padma. 'Trends in infant and child mortality and fertility', in : Population policy in India with special reference to infant mortality and fertility. Edited by M H Gandotra and Harayan Das, Blackie & Son Publishers Pvt Ltd. Bombay.
162. Swami A, and Mangol S. 'Economic implications of infant mortality', Journal of family welfare, June 1961.
163. Swamy V S. 'Some aspects of child mortality - A profile' Paper presented in the conference on 'Population dynamics and rural development,' organised by Indian Association for the Study of Population at I I T Powai, Bombay, December 28-30, 1979.
164. Talwar P P. 'Determinants of infant mortality; some evidence from Madhya Pradesh, India. Presented at the seminar on the determinants of infant mortality in India. Gujarat Institute of Area Planning and Population Council (New York), Ahmedabad 1984.





165. Talvaller H A. 'Association of infant mortality and high fertility : An empirical investigation', Newsletter Vol 22, no. 1, January, 1981, IIPS, Bombay pp. 2-11.
166. Taylor C E, Newman J S and Kelley, Harinder U. 'The child survival hypothesis, population studies, Vol 30, No. 2, July 1976, pp. 273-374.
167. The Population Council (WAFAR). (1980). The health and mortality in infancy and early childhood : report of a study group. Cairo.
168. Thora S, Avadhiya S, Chaurasiya H, Kaul K K. 'Perinatal and infant mortality in urban slums under ICDS scheme. Indian Pediatr. 1986 23: 595-598.
169. Tylor C E Et al (1978). 'The Harangwal experiment on interaction of nutrition and infections ; project design and effects upon growth. Indian journal of medical research, 68(supplement) : 1-20.
170. Udani P H. 'Morbidity and Mortality', Indian journal of child health, June 1962.
171. United Nations. (1984). Mortality and health policy (Romeo)
172. Vaidyanathan K E (Ed) (1972). 'Studies on mortality in India. Gandhinagar, Tamil Nadu : The Gandhinagar Institute of Rural Health and Family Planning.
173. Venkatacharya K. 'Influence of variations in child mortality on fertility : a simulation model study', in : seminar on infant mortality in relation to the level of fertility, cieded, Bangkok (Thailand) 1975, pp 87-102.
174. Visaria P M (1969). 'Mortality and fertility in India : 1951-1961. Milbank Memorial Fund Quarterly, 47(1)/1, 91-116.
175. Viswanathan T K, and Athvale V B, 'Morbidity and mortality in the neonates', Indian Paediatrics, April 1969.
176. Wade E L, et al, 'Observations on 1,000 live-born infants', Indian journal of child health, April 1963.



177. W H O (1978). 'Risk approach for maternal and child health care. No. 39.
178. W H O (1978). 'Report on social and biological effects on perinatal mortality. Vols I & II, Geneva.
179. W H O (1976). 'Causes of infant mortality. Chronicle, Vol.30, 198-201.
180. W H O & Sudan Ministry. (1981). Infant and early childhood mortality in relation to fertility patterns. Report on ad-hoc survey 1974-1976.
181. Myon J B and J E Gordon (1971). 'The Khanna study : population problems in the rural Punjab. Harvard University Press, p.193.
182. Hunkauer, Alfred, 'An approach to the cultural base of infant mortality in India', Population review, July 1959.











